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THE OTOLOGICAL MANIFESTATIONS OF NEUROLOGICAL DISEASE.¹

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It is not without considerable misgiving that one approaches the exposition of a subject such as the otological manifestations of neurological disease; for the interpretation of evidence, found from examination of the eighth cranial nerve function and reactions in such cases, is far from clear, and much additional material must yet be examined before conclusions of sufficient accuracy can be brought to apply to this problem as a useful clinical

adjunct in neurological diagnosis. May one be excused, however, in attempting to present such a topic on the ground that the extensive central connexions of the eighth nerve give reason to believe that interference with such must surely produce groups of symptoms capable of useful diagnostic and localizing value, while work already done upon this subject has even now permitted some observations to be set down in a manner which at least is approaching to fact?

ANATOMICAL CONSIDERATIONS.

Before approaching the clinical aspect of this subject it will perhaps be helpful to listeners if one briefly outlines the pathways and associations of the eighth cranial nerve. The fibres from the two sections of the inner ear, although continuing in separate bundles, unite to form one nerve trunk, the eighth nerve, and, traversing the internal auditory meatus in close association with the seventh nerve, pass downwards and inwards quite

¹ Read at a meeting of the New South Wales Branch of the British Medical Association on September 26, 1935.

close to the fifth and sixth nerves to enter the medulla just below the pons.* Within the medulla separation of the two divisions again immediately takes place. The fibres of the cochlear nerve end in the dorsal and ventral cochlear nuclei on the lateral surface of the medulla. From the cells of these nuclei two tracts arise, that is, a ventral tract composed of the fibres of the *corpus trapezoideum*, and a dorsal tract, which is represented by the *striæ medullares*. Many of the fibres of the *corpus trapezoideum* end in a large mass of grey matter called the *nucleus olivaris superior*, which is in the substance of the medulla. This nucleus is of some importance, for many of the axones from its cells pass backwards to end in the nucleus of the abducens nerve and, through the medial longitudinal bundle, in the nuclei of the trochlear and oculomotor nerves. In this way the organ of hearing is brought into connexion with the nuclei that preside over the movements of the eyeballs. The majority of the trapezoid fibres cross the mid-line and, reaching to the opposite superior olivary nucleus, then turn upwards and form the *lemniscus lateralis*. The dorsal fibres, represented by the *striæ medullares*, proceed medially across the floor of the ventricle, often immediately beneath the ependyma; reaching the median plane they dip forwards into the substance of the pons and, crossing the median plane, they join the lateral lemniscus. Not all the fibres from each side decussate, however; a large proportion pass to the lateral lemniscus of the same side. The lateral lemniscus is composed then of fibres from both sides ascending in the substance of the pons to reach the inferior colliculus and medial geniculate body. From these latter nuclei there proceeds the final tract to the cerebral cortex of the temporal lobe. (Figure I.)

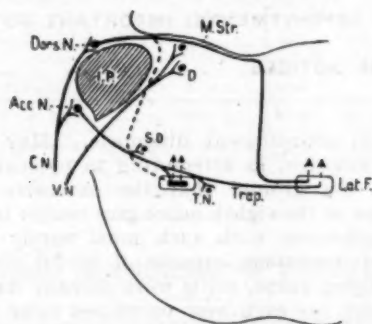


FIGURE I.

Diagram of the auditory path. C.N. = cochlear nerve, V.N. = vestibular nerve, Dors.N. = dorsal nucleus (*tuberculum acusticum*), Acc.N. = accessory (ventral) nucleus, M.Str. = medullary striæ, S.O. = superior olive, T.N. = trapezoid nucleus, Trap. = trapezium, Lat.F. = lateral fillet. (After Samson Wright.)

One would stress in passing that the cochlear fibres from each side not only form a double pathway immediately after entering the brain, but for each cochlea there is also a bilateral representation in the ascending tracts (lateral lemnisci) in that only a proportion of the fibres from each side decussate before making this ascent to the higher

centres. Such an arrangement compares with that found in the other two important protective senses—touch and sight—and would seem to serve the purpose of providing a considerable safety factor in each case. Experimental work has been performed, the results of which appear to support the functioning of such a safety factor in the hearing process. After the induction of a sound conditioned reflex in dogs, the effect upon the perception intensity threshold was noted following division or excision of various parts of the brain. In this work it was recorded that, after total decortication, the threshold of audibility was raised about 90 decibels. The loss after removal of only the right or left hemisphere, however, was only about 3 to 5 decibels. The elimination of one lateral lemniscus caused an additional drop of only about 10 decibels. I shall refer later to the operation of this safety factor in cerebral disease in the human being and to its possible application in cerebral localization and diagnosis.

The precise connexions of the fibres from the semicircular canals have not been quite so accurately worked out as in the case of those from the cochlea. The vestibular nerve enters the brain at a slightly higher level than the cochlear nerve and then proceeds backwards through the pons, its fibres ending in a series of terminal nuclei, which are placed beneath the floor and lateral angle of the fourth ventricle, and also in the cerebellar nuclei and cortex. From the mass of nuclei in the medulla ascending and descending fibres pass off, some of these making connexion through the median longitudinal fasciculus with the third, fourth and sixth nuclei, and others probably with the nucleus of the accessory nerve. Others of the descending fibres form the *fasciculus vestibulo-spinalis*, which passes downwards and distributes fibres to the various motor nuclei in the anterior column of the spinal medulla. Some of the connexions of each vestibular nerve are with nuclei of the same side, others decussate and pass to the nuclei and cerebellum on the opposite side. It is not known yet, however, which fibres decussate, nor whether some from each of the semicircular canals cross over. Also the exact composition and location of the ascending and descending pathways have yet to be precisely determined. Probably partial decussation takes place from all the canals; for, although the general effect of stimulation is to cause postural movements in the direction of the vestibular flow, this effect is always bilateral and provides probably the most beautiful illustration of reciprocal neuro-muscular action. The falling, past-pointing and trunk and head rotation so induced are not sudden and dramatic like the effect of a push or a pull from outside, although the patient may experience an impression of such an effect which, however, is sensory and forms part of the subjective experience of vertigo. The actual movement is smooth and slow, more resembling a drift than a sudden unbalancing. Only a bilateral control brought about by crossed innervation and association of cell stations could produce such an effect. (Figure II.)

DISTURBANCES OF FUNCTION.

Each and all of the various subjective symptoms and departures from the normal otic reactions may arise either from aural disease or upset *per se*, or be due to intracranial disorders, either destructive and pressure-producing, such as tumours and cysts, or the toxic and degenerative changes which follow a variety of intoxications, vascular disease, tabes, disseminated sclerosis and encephalitis. A recording of the findings after complete examination of the eighth nerve on both sides and in both of its divisions may be helpful not only to exclude an aural cause, but also to help determine the site of intracranial disease and, further, at times to provide supporting evidence to enable a distinction to be made between degenerative and destructive changes. It is with the dual purpose of excluding the ear itself as the cause of abnormal symptoms and reactions, and of bringing to the performance of the various tests the finesse of

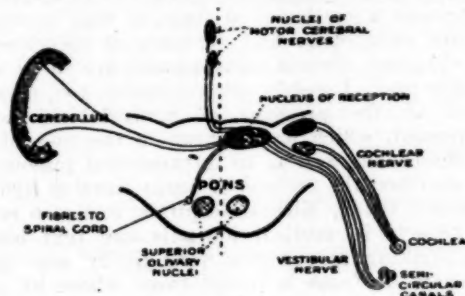


FIGURE II.
Scheme showing central connexions of the vestibular nerve.

experience and repeated practice, that the otologist may assist in this part of the neurological investigation. The task of interpretation and application of the oto-neurological observations must for the time being be one for close collaboration between the otologist and neurologist, until such accuracy may be brought to the conclusions therefrom that useful clinical facts may be established.

I shall now briefly review the otological analysis and then, in a short survey of clinical application, may I attempt to outline some possibly useful neurological conclusions for your further consideration?

It is upon demonstrable otic changes or the demonstration of associated neurological signs and symptoms that the examiner is able to determine primarily which of these two regions (aural and cerebral) is responsible for the trouble. It is presumed for the purpose of this paper that the differentiation between an otic and an intracranial lesion has been made.

Disease involving the auditory and vestibular neural mechanisms, as in any other, may give rise to phenomena of irritation or of depression and destruction. The purpose before us is to endeavour to form an estimate of the significance of tinnitus and vertigo or of deafness and altered or absent vestibular reactions.

Subjective Symptoms.

The subjective phenomena, which may be described as those of irritation, namely, tinnitus and vertigo, reveal very little of themselves to offer any indication of the reason or site of their production. We shall therefore pass on to the more important and more useful observations, which are to be made as a result of analytical recordings of the responses after purposeful stimulation of the auditory and vestibular receptors.

Neurological Disorders of the Hearing.

It is to be stressed that failure of the hearing function can no longer be regarded as simply something which may be obviously and readily noted in a cursory examination, such as with a voice or a watch. Sound perception in its most elementary conception is divisible into quite a wide spectrum with a range extending from 16 to 32,000 vibrations per second. Interference with this function may involve the spectrum at either end, but especially in the higher frequencies, without obvious deafness, so that the detection of hearing loss calls for an estimation of the perceptive powers, at least at intervals, throughout the tone range. Something akin to perimetry has been hoped for in the analysis of the sound spectrum, especially since it is now more or less proven that this spectrum has a projection along the cochlear spiral. It was anticipated that a similar projection might be revealed in the cerebral pathways and cortex. So far the evidence seems to point against any tract or cortical arrangement subserving pitch. Dana Drury⁽²⁾ has recorded the results of audiometric examination of some 300 cases of proven and localized intracranial lesions from Harvey Cushing's practice. While it was here hoped that a grouping of the individual audiogram charts might reveal particular types of curve indicative of the location of intracranial trouble, no such result has been established. One feature, however, seems common to almost all tumours and also to many other brain diseases in which recordings were made, and that is a dropping off in the perception of higher tones, although the patient was unaware of any deafness. Dandy⁽³⁾ has suggested that this high tone loss indicates some interference with the function of the inferior colliculus and medial geniculate body. Drury's series, however, reveal a much more widespread aetiology than lesions of the *corpora quadrigemina* region alone. The otologist will realize that such a form of hearing loss has for many years been recognized as the common finding in "nerve deafness", even when the cause is thought to be in the cochlea. Can we say more than that such a finding suggests some physiological result common to depressing influences acting upon any or all parts of the auditory neural pathways, whereby the ability to receive or to conduct impulses above a certain frequency is impaired. Where and how the changes take place which produce this shrinkage of higher tone perception we cannot say; neither is there any ground for a conclusion that the change is in any

way akin to papilloedema or other happenings due to increased intracranial pressure. Whatever the explanation, the finding is so nearly constant that in cases of suspected intracranial disease it may be worth looking for when supporting evidence is required. Throughout Drury's large series of cases and in my own and other writers' audiograms I have been unable to see any further evidence of pitch localization in the central nervous system. I believe I am right, too, in stating that the frequency element of vision, namely, colour, has no definite neuro-anatomical counterpart. Does this frequency selection exist in the nervous system at all? On physiological grounds Adrian⁽⁴⁾ has questioned the power of nerve fibres to convey impulses at a greater frequency than 1,000 per second. Dandy⁽⁵⁾ has recorded audiometrically two cases in which subtotal division of the auditory nerve was performed, leaving, it was estimated, only one-eighth to one-tenth of the cochlear branch, yet hearing remained nearly normal, and in the audiograms the only loss was the previously described depression in perception of the highest tones. The same authority,⁽⁵⁾ too, has recorded audiograms of several cases of gross cerebral destruction involving a large part and even the whole of the temporal lobe. In such cases there was variable aphasia, which, strangely enough, was not always permanent, while the audiogram charts again showed very little loss of sound perception and no evidence of pitch selection.

Reverting then to the attempted analogy of the sound spectrum with the neuro-visual analysis of perimetry charts, one sees an essential difference in the two functions of sight and hearing, which might explain the absence of any particular tone arrangements in the hearing pathways. Vision has a definite spatial quality and the optic image is projected spatially on the retina. So far an analogy partly holds good, for it seems that sound too is given a spatial distribution, in terms of pitch, in its application to the end organs in the cochlea. A difference may be expected to exist, however, as soon as consideration is given to the essential qualities in the perception and interpretation of these two senses. The spatial quality is still essential in vision, so that objects may be interpreted in terms of form. May it not reasonably be expected then that this spatial arrangement would persist in the visual pathways? As regards sound, the first essential is that there should be a receptor able to detect, but not essentially to interpret, frequencies over a useful range, both for protection and for localization of direction. Beyond this, tonal interpretation surely becomes merged into the enormous combination of sound patterns which go to make up in the human being all the complex sounds of speech, music *et cetera*. Does it not seem reasonable to assume, on both physiological and psychological grounds, that a tonal arrangement is not an essential of the auditory pathways? I have briefly enlarged upon the point, because one finds such an arrangement of fibres is being so often hoped for and looked for both by the otologist

and the neurologist today; it has not been found, and perhaps much time and energy will be saved if it could be reasoned that such is not to be expected.

An examination of the hearing function is not, however, entirely without its use in neurology. That this function should be carefully examined along with the other cranial nerves in all suspected cerebral cases is obvious, even if only to exclude or to indicate a possible acoustic neuroma. One still has hope, however, of going further than this.

What seems to myself to be a most promising practical point in consideration of the hearing function is the possible utilization of the anatomical safety factor, previously described, as a contribution towards the process of tumour localization in the posterior fossa, and especially perhaps in providing at times a distinction between intracerebral and extracerebral tumour formation. Posterior fossa tumours, either intracerebral or extracerebral, may present a similarity of signs, so that increased pressure phenomena and evidence of interference with the same cranial nerve groups are to be seen in either case. Considerable confusion, too, may be caused by the presence of contralateral nerve involvement, which may appear in the case of an extracerebral as well as an intracerebral tumour. I have searched the records of brain cases at Sydney and Royal Prince Alfred Hospitals, and also many case reports in medical journals and text books. It is striking to see how very rarely was there noticeable deafness in those cases where at *post mortem* examination an intracerebral tumour was found. On the other hand, when the tumour was extracerebral and in the vicinity of the cerebello-pontine angle, deafness was commonly early and marked on the side of the lesion, except perhaps in the case of arachnoid cyst formation. It seems reasonable now to suggest that where unilateral deafness is observed the lesion will very likely be found to be extracerebral and therefore perhaps accessible to surgical approach. In the absence of noticeable deafness there is a very great probability that the trouble is intracerebral and inaccessible. There are exceptions, of course, to such conclusions as this; but when a study of the hearing is taken carefully into account with the balance of neurological findings, such an observation as is now stressed may be of considerable value in localization and prognosis. The following cases, which have been selected because the *post mortem* specimens and photographs are available, amply demonstrate the degree to which a ponto-medullary tumour may progress without much deafness.

CASE I.—A.S. had been affected with attacks of dizziness for two and a half years when I first examined him at Sydney Hospital. He had paresis of the left external rectus and right internal rectus, and also some weakness of the left side of the face. His eighth nerve responses were as shown in the audiogram and the results of the caloric tests. The audiogram is reproduced in Figure IIIA. The caloric test on the first occasion gave no reaction. On the second occasion very fine, almost negligible, nystagmus was noted after 90 seconds; there was no vertigo, and no past-pointing was noted.

One year later, and just before his death, all the previous symptoms had become more marked. In addition there were Rombergism, adiadokokinesia, and well marked left seventh nerve palsy and a left Babinski sign. The patient reported a humming tinnitus and occasional slight hearing

The unilateral deafness and general eighth nerve failure which arise in tumours of the cerebello-pontine angle and in the acoustic neuromata is too well known to require illustration here; but the

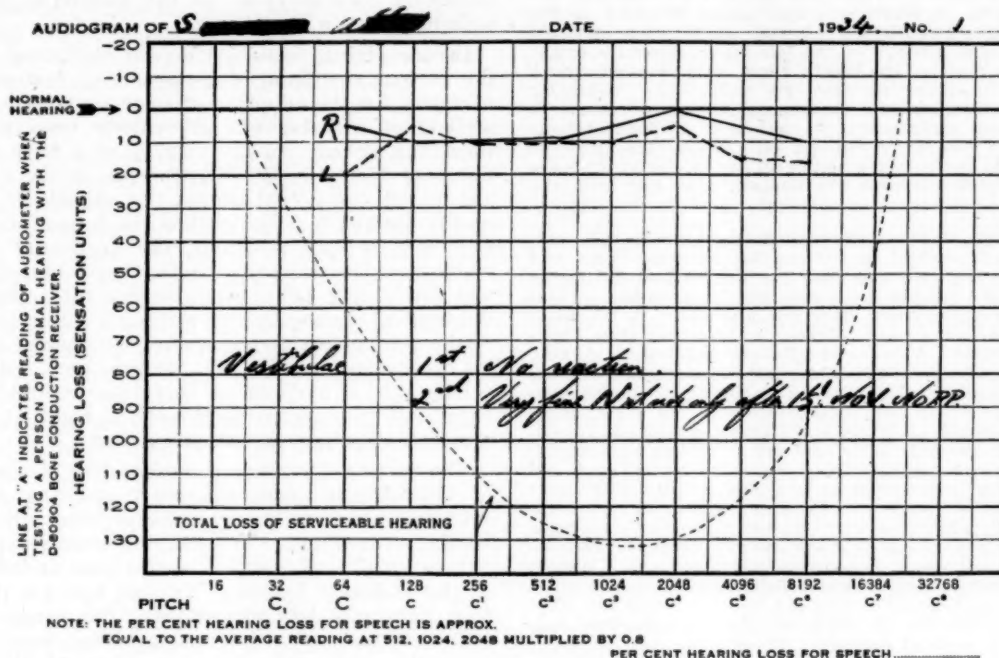


FIGURE IIIA.

loss on the left side. I did not have opportunity to graph his hearing again, but the resident medical officer recorded the hearing, right and left, as being apparently normal.

The *post mortem* photographs of his brain show well the huge ponto-medullary tumour infiltration in the vicinity of the eighth nerve decussations. (Figure IIIb.)

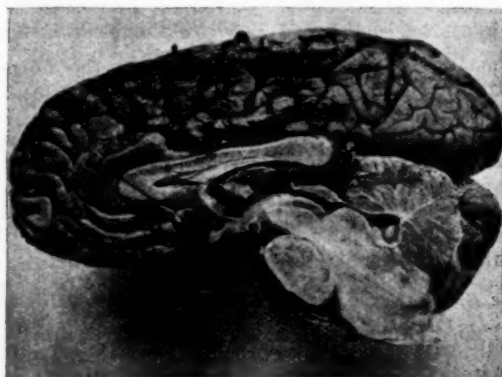


FIGURE IIIb.

CASE II.—The second patient of whom I have been able to secure a picture was a boy, aged nineteen years. He died some years ago at Sydney Hospital. This case was before the days of audiograms and vestibular testings, but the record is there in the case notes (hearing not affected). (Figure IV.)

contrast is well marked when compared with the two previous cases of intracerebral growth. Two such cases recently recorded by Uren and Russum,⁽⁶⁾

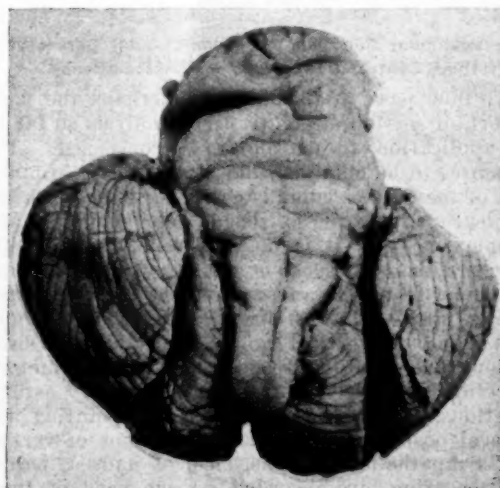


FIGURE IV.

however, reveal the confusion which might arise when, although the tumour is extracerebral, the

symptoms suggest a wide involvement and in addition are bilateral.

CASE III.—The first patient had weakness of the legs, especially on the left side, where there was also disturbance of sensation. There was bilateral papilloedema, but no headache or vomiting. The tongue deviated to the right (right twelfth nerve) and examination revealed weakness and atrophy of the left lower extremity (right pyramidal tract). The eighth nerve tests revealed almost complete deafness in the left ear, while vestibular responses were entirely wanting on both sides. Owing to the marked deafness on the left side, a diagnosis was made of a tumour of the left cerebello-pontine angle, of such a size as to cause pressure on the vestibular branches of the eighth nerve of the opposite side and upon the opposite cerebro-spinal tracts above their decussation.

CASE IV.—The second patient had experienced paræsthesia of the right side of the face for three years, and later also of the left side, and occipital headaches. During the past six months her vision had been failing. There was some diplopia and there was a tendency to fall backwards and to the right. There had also been some right-sided tinnitus. Very recently there had been a jerking of the right arm and leg (left cortico-spinal tract). Examination revealed bilateral papilloedema, spontaneous nystagmus to the left, past-pointing to the right, Rombergism towards the right, and right-sided adiadokokinesis. Testing of the fifth nerve revealed a blunting of sensation on the right side of the face. The third, fourth, sixth and seventh nerves appeared to be normal. The eighth nerve tests revealed complete absence of air conduction on the right, very slight responses to the vestibular tests from the right side, and delayed but otherwise normal responses from the left side. The clinical diagnosis was a tumour of the right cerebello-pontine angle.

The diagnosis in each of these cases was subsequently proved correct. It will be seen that the correct conclusion was arrived at in each instance as the result of the marked interference with the eighth nerve, and especially of the hearing function. Apart from this finding the exact location of the tumour might have been very confusing, in view of the presence in each case of symptoms from contralateral cranial nerves and motor tracts.

The Vestibular Function (the Semi-Circular Canals and their Central Connexions and Associations).

We now pass to the last and perhaps the most important section of eighth nerve analysis so far as its application to neurology is concerned. The responses to be obtained and studied after stimulation of the semi-circular canals, like those from the cochlea, are now recognized as being multiple and complex, so that it is no longer sufficient merely to record the occurrence or not of nystagmus. Both ears must be tested, and each in the horizontal and sitting positions, to secure results from the horizontal and the vertical canals respectively. Observations are made in respect of the time factors, direction and type of nystagmus, and of postural reactions, such as head turning, past-pointing and general posture; in addition, sensations of vertigo and sympathetic reactions, such as nausea, pallor, and sweating, are recorded. From each of these reactions it is probable that something may be learned, while the composite pictures of the complete tests, especially when added to that of the balance of the neurological survey, may be expected

to yield groups or symptom-complexes able to be applied to cerebral localization and diagnosis.

The caloric test is now generally accepted as the most useful method of vestibular stimulation, since, unlike the rotation stimulus, this method is strictly unilateral in its application.

Before giving consideration to variations from the normal vestibular responses, may I stress the necessity for the adoption of some nearly standard method of carrying out the caloric tests and of recording them? In my own cases I have found water at 15.5° C. (60° F.), flowing at the rate of about 100 cubic centimetres per minute to be a useful standard. The patient is tested via both ears and in two positions, the horizontal (*Pd*), which provides stimulus to the horizontal canals, and the sitting (*Ps*), which brings into operation the vertical canals. A stop-watch recording is made of the time of commencement of nystagmus and of its duration. Additional factors recorded are: (i) the type of nystagmus—direction, excursion and rate; (ii) past-pointing—direction, right and left arm; (iii) vertigo, nausea and pallor.

The method of recording employed by Thornval,⁽⁷⁾ of Copenhagen, commends itself as being simple, expressive, and easily read and compared with other similar recordings. I quote the normal average figures at 15.5° C. (60° F.), expressed accordingly in the Thornval formula. In this formula, R and L = right and left respectively; the figure above indicates the rate of nystagmic movements; the remaining figures indicate the time of the commencement of nystagmus and its duration, and the temperature of the water; N = nystagmus, V = vertigo; PP = past-pointing.

150 pm
R 25" — 2' 30" Hor. N to Lt., Sl. V, PP to Rt., both arms
P. 60° F.
L 25" — 2' 30" Hor. N to Rt., Sl. V, PP to Lt., both arms

150 pm
R 25" — 2' 30" Hor. N to Lt., Sl. V, PP to Rt., both arms
P. 60° F.
L 25" — 2' 30" Hor. N to Rt., Sl. V, PP to Lt., both arms

Passing on now to variations from the normal vestibular reactions in neurological disease, it seems unwise at this stage to press any claims for the establishment of definite site complexes, although some grouping of reaction types may now be suggested. Naturally the greatest changes may be expected from lesions in the posterior cranial fossa, and especially from those which involve the eighth nerve trunk, the pons or the medulla.

The Eighth Nerve and Cerebello-Pontine Angle Lesions (Extracerebral).

All will be familiar with the almost total unilateral abolition of eighth nerve function, both auditory and vestibular, when the nerve trunk is directly involved or pressed upon. Fisher and Jones⁽⁸⁾⁽⁹⁾ have described a frequently observed contralateral vestibular effect, namely, an inactive or greatly dulled vertical canal of the opposite side, in tumours of the cerebello-pontine angle. Confusion begins to arise when there are other contra-

lateral symptoms, so that an intracerebral lesion might be suspected. Such a happening is well illustrated by the two last mentioned cases of Uren and Russum, in which there was evidence of interference with the opposite vestibular pathways and the opposite pyramidal tract (homolateral limbs) and fifth nerve respectively. The gross degree of unilateral eighth nerve failure on the involved side correctly gives the diagnosis in these cases.

Intracerebral Tumours.

Intracerebral tumours involving the labyrinthine nuclei and pathways, that is to say, at the level of the pons and upper part of the medulla, usually produce considerable, although not always total, loss of vestibular responses on the worse side. Bilateral vestibular disturbances, too, are common in these cases, and such will often be complete, or less frequently perhaps of a dissociated type, so that one set of canals may be wholly inactive on both sides, and the other may show various stages of alteration in time and in degree of nystagmic excursion; or such postural reactions as post-pointing may be absent from one canal and present in the others, and so on, in a variety of combinations. I have seen no consistent localizing factors in tumour formation, however, such as would define the particular nuclei or fibres for either the vertical or horizontal canals.

We should be going a long way forward if we could find some useful additional means associated with these observations of the hearing function as already described, to define tumour and hyperplastic disease from the toxic and degenerative states and, further, if we could determine, when tumour is evident, whether it is extracerebral and perhaps operative or intracerebral and not accessible. I do not dare to make any bold claims in these directions, but very timidly perhaps would proffer some suggestions based upon observation and case analysis.

Let us presume we have before us the type of case with involvement of the fifth, sixth or seventh, and the eighth nerves. I suggest now, in respect of the vestibular reactions, that the more widespread the bilateral vestibular failure, especially if it involves the opposite horizontal canal, the more likely is the lesion to be intracerebral.

May we then set up, as a foundation at least for future observation, the following:

1. Gross unilateral deafness and vestibular failure, even if associated with symptoms of involvement of the contralateral vertical canal and other opposite side symptoms, is suggestive of an extracerebral, acoustic or cerebello-pontine angle tumour.
2. Little or no deafness, but ipsilateral vestibular failure, especially if there is also suppression or failure of the opposite horizontal canal, strongly supports an intracerebral lesion.

The other point of definition between hyperplastic and degenerative conditions has arisen very often and is illustrated by the type of case in which

there is perhaps a history of vertigo and unsteadiness of gait, and then a doubt between such conditions as disseminated sclerosis and a cerebellar or pontine tumour. The vestibular pathways appear to be particularly vulnerable in many of the degenerative states (Cases V, VI, VII, XI, XII, XIII, XIV, XV); less frequently the auditory pathways are involved. In vascular disease, and in degenerative conditions too, the vertical canals appear more vulnerable. The vestibular disturbance arising in this type of case will commonly be found to be bilateral, sometimes complete and at others occurring in a dissociated manner. It is this bilateral and often widespread vestibular interference without other localizing brain stem signs which I have found of use in reasoning that a disturbance of such dimensions, without adjacent nuclear involvement, must be vascular, toxic or degenerative. Many cases, of course, will readily declare themselves as disseminated sclerosis, arterio-vascular disease, *tabes dorsalis et cetera*; but many are of doubtful designation, and in such, vestibular tests may in the manner mentioned give security to the diagnosis. Again this application of eighth nerve testing is best illustrated with the description of some cases.

CASE V.—J.H., a patient at Sydney Hospital, for five years had had attacks of giddiness and headaches, no vomiting. Examination revealed optic neuritis and some atrophy and slight uniform contraction of the visual fields. There was slight loss of hearing throughout the whole range, increasing at 1,024 cycles.

R 1' 50" — 1' 20" N greatly reduced, no PP, no V
Pd
L 1' 25" — 55" N still less than Rt., no PP, no V
R 65" — 10" N only sl. flicker
P
L no response

This case was confusing, in view of the optic neuritis and headaches. The long history, with periods of recovery, supported a degenerative lesion. The widespread vestibular failure and the absence of other medullary signs further supported a degenerative change. A report from the patient twelve months after examination states that he is well and working. The condition is probably an atypical disseminated sclerosis.

CASE VI.—F.D., a patient at Sydney Hospital, had suffered for six months from frontal and orbital aches and vomiting. Cranial and spinal nerves were intact. The hearing was normal, and no abnormality was revealed by tests of the vestibule. Seven months later the patient was reported to be well and working. The conclusion was that the condition was probably toxic; but in view of the absence of other otic changes the focus of reaction was probably in the vestibular nuclei.

CASE VII.—A.B., aged twenty-nine years, was seen at Sydney Hospital, complaining of fits for six months and giddiness on rising and vomiting for three months. He had suffered from frontal headaches for three months, failing eyesight for three months and earache for two weeks. There had also been an alteration in his speech (stuttering).

Examination revealed that the visual fields were greatly and uniformly contracted. The third, fourth, fifth, sixth, seventh, ninth, tenth, eleventh and twelfth cranial nerves were intact except for coarse tremor of the tongue. By

tests of the eighth nerve hearing appeared to be good. Results of vestibular tests were as follows:

R no response
Pa
L no response

R no response
Pa
L no response

The sensory spinal nerves were intact. There was no paresis or paralysis, but marked incoordination and dysmetria. Reflexes were all exaggerated but otherwise unaltered.

The diagnosis in this case appeared to rest between cerebellar tumour and degenerative disease. In view of the widespread bilateral failure of vestibular reactions one further supported the degenerative explanation. The patient left hospital after making some slight improvement and the diagnosis was (?) disseminated sclerosis.

Cerebellar Disease.

The precise effect from cerebellar disease is still somewhat obscure. Experimentally, complete nystagmic reactions have been produced in animals after removal of the cerebellum, so that it seems that this structure is not essential to the reflex. Nevertheless there is every likelihood that disordered cerebellar control might cause variations in the reactions in cases of cerebellar disease. Clinically, an interpretation of the observation of possible cerebellar effects is hampered by the fact that there is commonly a considerable degree of secondary pressure directly upon the vestibular nuclei in the pons. One finding which is quite common, however, in lesions of the cerebellum when the basal nuclei are still able to function, is perversion of nystagmus so that the direction of the components may be reversed from the normal or a rotary reaction may be observed when normally it should be horizontal. Other observers have stated that in cerebellar disease, nystagmus, both spontaneous and induced, may show changes in its form from time to time in the same case. There seems no doubt, however, that pure cerebellar disease without secondary pressure effects does not give rise to abolition of any of the vestibular responses.

The following case very well illustrates how a huge cerebellar tumour may exist without destruction of vestibular reactions. There is also shown a typical perversion of nystagmus giving rise to a rotary instead of horizontal form of ocular movement.

CASE VIII.—R.V., aged eighteen years, a patient at Sydney Hospital, complained of headaches, vomiting and giddiness for two months prior to admission. There were bilateral papilloedema, Rombergism and ataxia and left-sided hypotonus. *Post mortem* there was found a huge cyst occupying almost the entire left lobe of the cerebellum (Figure V). The hearing was recorded as good on both sides. Vestibular tests revealed the following:

R 1' normal, N, PP 4", no V
Pa
L 3' rot. N, no PP, no V
R 1' rot. N, PP 4", no V
Pa
L 3' rot. N, no PP, no V

It will be noted, too, in this case, that past-pointing was absent on the side of the lesion, while the reaction

times were considerably reduced on this side also. The absence of induced vertigo is quite commonly noted in all sub-tentorial tumours.

Lesions above the Pons.

In lesions above the pons no precise alterations in the vestibular reactions have as yet been defined. Whereas it does appear that the essential effect of vestibular stimulation is, through medullary and spinal reflexes, to cause an increased tone in the muscles of posture on the same side as the stimulus so that ocular deviation (the slow component of nystagmus), head turning, past-pointing and falling result towards the side of stimulus, the *modus operandi* and the exact pathways concerned in the quicker or recovery component of nystagmus have not yet been defined. Many observers claim that this reaction is a nearly voluntary one and of cortical origin. That it is not visual has been shown by

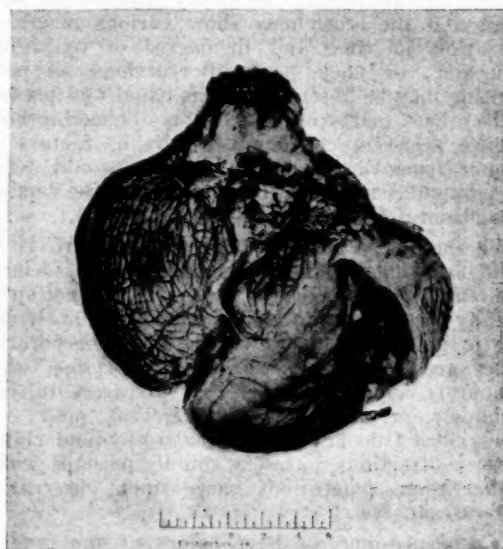


FIGURE V.

the fact that the whole of the nystagmic reactions can be demonstrated in the ocular muscles after the excision of the eyeball.⁽¹⁰⁾ I have two cases under observation at this time which may cast some light upon this problem. The details of these two cases I will quote you for what they are worth and also perhaps as an indication of a basis upon which further observations may be made.

CASE IX.—T.S., aged sixteen years, a female patient at Sydney Hospital, complained of headaches and vomiting for about nine months. On examination there were found bilateral papilloedema and a suggestion of bilateral lower half hemianopia. The patient was in a rather torpid condition and did not cooperate well. Further, there was noted a right pupil which was dilated and did not react to light, while the left pupil reacted only sluggishly. There was weakness also of both superior oblique muscles, and the eyeballs rolled downwards and inwards instead of upwards when the lids were closed. The third and sixth nerves were active. The fifth, seventh,

ninth, tenth, eleventh and twelfth nerves were intact. The general muscular tone and reflexes were all increased on the right side, and the right plantar reflex was extensor. There was no actual loss of power and there was no dysdiadokokinesis. Sensation throughout was normal. The only localizing signs were the paralysed pupil of the right side and loss of power of the fourth nerve. These signs would seem to indicate the lesion acting particularly upon the region of the *corpora quadrigemina* and upper portions of the brain stem. The examination of her eighth nerve revealed the following:

- R no reaction 2½'
 Pa
 L deviation to Lt. ½', no V, no PP
 R sl. deviation Rt. 2', no V, no PP
 P.
 L no reaction 2½'

The point which I wish particularly to stress in this case is that there was a constant spontaneous drift of both eyes to the left. This was increased after syringing the left horizontal canal. It was unaltered on stimulating the

lemnisci and *corpora quadrigemina* would surely account for such a disturbance of hearing, especially since the pathways from each side were involved and at a site above the previously described safety factor area. (Figures VII and VIII.)

CASE X.—The second patient in this group, B.K., aged sixteen years (Sydney Hospital), complained of headache, vomiting and of vague giddiness, terminating in temporary blindness, coming on in attacks during the week prior to examination. Examination of his nervous system revealed double papilledema and a right homonymous hemianopia. The ocular movements and pupillary reactions were all normal. Examination of his fifth, seventh, ninth, tenth, eleventh and twelfth nerves revealed no abnormality. His reflexes were all normal, and there was no loss of motor or sensory function. This patient has been operated upon, ventricular puncture and decompression being performed. The ventricular puncture revealed evidence of increased pressure and distension, and of "loculation" in the left lateral ventricle. The fluid from the right lateral ventricle was not under pressure and was of normal appearance and chemical composition. The hearing

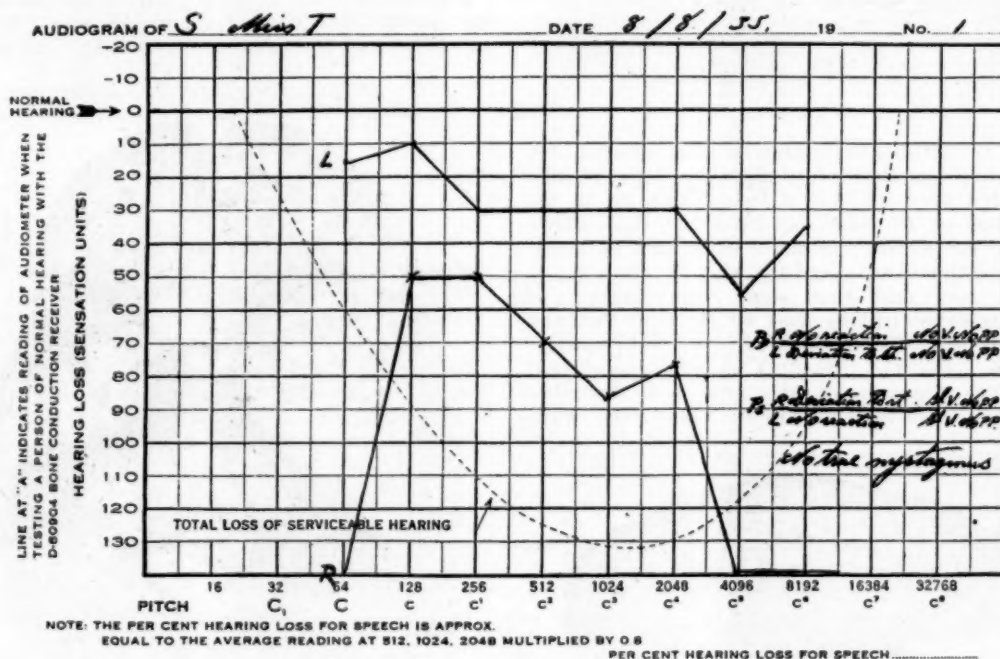


FIGURE VI.
Audiogram of T.S.

right horizontal canal, but was reversed to a deviation to the right side when the stimulus was applied to the right vertical canal. In other words, one appeared to be able to induce the slow component of nystagmus; but there was no reaction (quick) component. This patient has died since my notes were made. *Post mortem* a large cyst was found expanding the third ventricle, the aqueduct and the fourth ventricle into one large cavity. Above, the roof of the aqueduct and fourth ventricle had become thinned out and expanded so that the *corpora quadrigemina* were separated and lay laterally instead of on top of the mesencephalon. The lateral lemnisci could be seen thinned out and lying along the lateral wall of the lower half of the cyst. Fourth nerve paresis and pupillary disturbance can be explained as due to this mesencephalic distension. Clinically one was at a loss to explain the deafness in what was apparently a suprapontine lesion. The great stretching and displacement of both the lateral

curve in this patient showed a very slight uniform loss in both ears, but increasing, particularly with the higher tones, on the left side. The vestibular tests revealed the following:

- R 25"—3' 30" PP Rt. extreme and V
 Pa
 L 25"—3' 30" PP Lt. extreme and V
 R 40"—2' 45" Hor. N, no V, PP Rt. (extreme)
 P.
 L 25"—2' 30" Hor. N, no V, PP Lt. (extreme)

I noted in this case that although both nystagmic components resulted from stimulation of each of the canals on both sides, the head, eye and trunk deviation occurred in a manner which was quite definitely extreme and was more marked than I had seen in any other cases; this certainly was not normal. The impression gained was that the true vestibular reaction (slow component of

nystagmus, rotation and falling) was over-active, due to some inhibition of the recovery factor (quick component and righting reflexes).

One needs perhaps to have seen these cases to have been impressed with the disproportion between the two elements of these postural reactions. If the commonly made claim is correct, that the recovery



FIGURE VII.

element is cortical, there may be some grounds for the assumption that vestibular reactions of this dissociated type indicate a lesion high up in the brain stem or in some way involving the cortico-spinal or the cortico-pontine or some such pathway. The suggestion is advanced for what it is worth.

I am convinced that some interpretation of localizing value will in time be given to this and other types of dissociated vestibulo-cochlear reactions. For the present I should suggest that vestibular responses of the type last described indicate a lesion of the brain stem above the oculo-

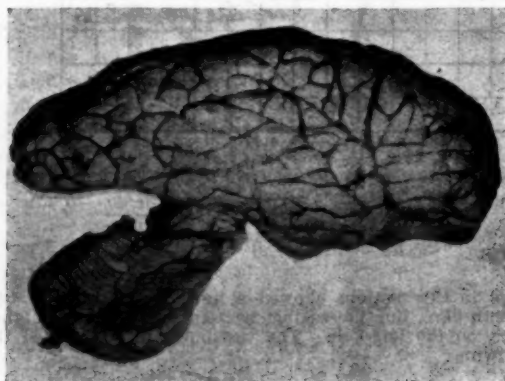


FIGURE VIII.

motor nuclei. In these two cases the balance of neurological evidence would seem to point to a tumour of the upper mesencephalic region and of the third ventricle respectively. It will be realized that each would quite readily cause pressure upon the descending cortical tracts.

If the effect of this and similar papers is to awaken cooperation between these two specialties

in investigating neurological cases, then at least some good may be brought about, and further work so inspired may lead in time to more precise and perhaps more useful conclusions.

Pleading insufficient opportunity to study available material as the excuse for the incomplete state of our knowledge, may I now appeal to the neurologist to cause members of our specialty to see more of these cases for detailed eighth nerve testing, and at that not just once, but repeatedly, during the course of observation of the case, and especially before operation, and then finally, and perhaps more usefully for our present purpose, in the *post mortem* room, where perhaps we may complete the lesson which will help to bring earlier assistance to others in times to come. Only a complete follow-up of each case will lead to any useful conclusions.

Figures IX and X amply stress the weight of my appeal. The case of Figure IX was clinically an obvious posterior fossa tumour, but the special

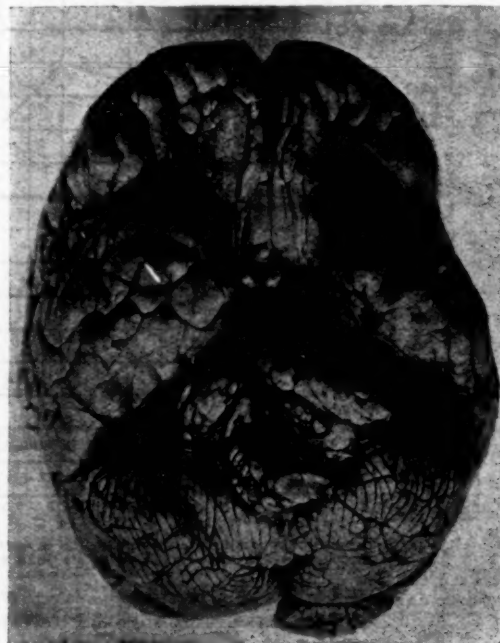


FIGURE IX.

eighth nerve tests were never sought. Likewise in B.N. (Figure X) no otological opinion was obtained and, sad to relate, the diagnosis was rather astray in localization. In each there were confusing signs. There is no ground for doubt that investigation of the eighth nerve would have given conclusive evidence in each case during the life of the patient. Now that death has supervened we have the specimens, but no eighth nerve clinical recordings. Opportunity has been missed.

I conclude now, leaving before you a brief *résumé* of a further series of cases which it has been our

own privilege to study. It is not proposed to go over each of these with you now; but they are before you in your copies of this paper for your own examination and conclusions. I hope some will be sufficiently interested to study these notes further and perhaps in time to comment on them.



FIGURE X.

SUMMARY.

I have attempted to outline:

1. The probable limitation of the application of hearing analysis in neurological cases and yet to show some useful purpose in the auditory examination.

2. The use of eighth nerve examination to help: (a) to differentiate intracerebral tumours from those which are extracerebral, in the posterior fossa; (b) to define degenerative from hyperplastic types of central nervous disease.

3. The possible application of eighth nerve examination in the localization of a tumour in the pons, the cerebellum, or the mesencephalon, partly for an application to clinical neurology, but also with the object that more may be learned of the central connexions and neuro-physiology of the eighth nerve.

ACKNOWLEDGEMENTS.

I wish to acknowledge the assistance of physicians and surgeons at Sydney Hospital who have made their cases available for examination, and also the Kanematsu Institute of Pathology at Sydney Hospital for the opportunity to examine specimens and for many of the photographs. Finally, special thanks are due to the department of surgery at the University of Sydney for assistance in the examination of the brain in Case I.

ILLUSTRATIVE CASES.

CASE XI.—R.A., a patient at Sydney Hospital suffered from diplopia, headaches and some vomiting for nine weeks. He was reported to be mentally dull. He could spell, but did not know the alphabet. There was some contraction of the visual fields, especially the left, of a more or less

uniform type. The third and fourth nerves were normal. There was slight sixth nerve paresis on both sides. The fifth, seventh, ninth, tenth, eleventh and twelfth cranial nerves were normal. The spinal nerves (motor and sensory) were normal. The hearing was normal. Vestibular tests revealed the following:

R 25"—2' 5" Nor. N, PP Rt., no V
Pa
L 30"—2' 45" Nor. N, PP Lt., no V
R no response, no PP, no V
Pa
L no response, no PP, no V

This case shows bilateral vestibular disturbances with selection of both vertical canals. There being no other localizing signs, I concluded that the explanation of his trouble was degeneration.

CASE XII.—Mrs. A.W.C. (private patient) had had vertigo and tinnitus with retching in attacks on and off for twenty years. On examination there was seen an old, healed, sclerosed and adherent eardrum on the left side, the result of suppuration in early life. The cranial nerves were all intact and the fundi normal. The eighth nerve findings were as follows:

Hearing:

R a uniform loss of 35 Db for all notes.
L 64, 128 and 8,192 not heard at all.

All notes of the middle of the scale showed a loss of 60 to 70 Db.

Vestibulae:

R 25"—1' 35" fine rot. N to Lt., sl. PP to Rt., V+ 60° F.
Pa
L 35"—2' 5" fine rot. and hor. N to Rt., sl. PP Rt. arm to Lt.
R 1' 30"—1' 30" V, fine rot. N to Lt., no PP, no V 60° F.
Pa
L 35"—1' 65" V, fine rot. N to Rt., sl. PP Rt. arm to Lt., V+

The vestibular findings are interesting in that only very fine nystagmus was produced from each of the canals, that of the right vertical being considerably delayed and also the duration being shortened in all positions on either side. There was marked vertigo, however, from both canals on the left side. This case is of interest in that the condition is undoubtedly a typical Ménière type. From inspection one would be inclined to presume that the condition of the left eardrum would account for much of her trouble. The eardrum, however, improved considerably with treatment, yet the patient's symptoms persisted. My conclusion from this and other cases of a similar type is that, either primarily or secondarily, in these cases some degeneration of the vestibular neural tracts takes place.

CASE XIII.—A.G., a patient at Sydney Hospital, had suffered from sudden occipital pains with nausea, vomiting and diplopia on and off for eight weeks. There were slight ptosis and slight internal and external rectus paresis on the right side. The other cranial nerves were normal. The hearing was normal. Vestibular tests revealed the following:

R 1' 30"—1' 30" N reduced, no PP
Pa
L 30"—1' 50" N normal, V marked
R no reaction in either position, no V
Pa
L no reaction in either position, no V

This patient died. *Post mortem* there was found a large aneurysm of the right internal carotid artery adjoining the cavernous sinus. In addition, the left internal carotid artery and the vessels of the circle of Willis were rudimentary.

The disturbances in this case were obviously of vascular origin, and the patient was apparently dependent very largely upon his right internal carotid circulation, which unfortunately was hampered by the presence of aneurysm. The vestibular reactions were interesting in that there was very little reaction at all from the whole of the right side, and both vertical canals were entirely inactive.

CASE XIV.—G.P., aged fifty-five years, a patient at Sydney Hospital, complained of seeing double for two months and of pain behind the left eye for one month; he had had influenza four months previously. There was a history of chronic myocarditis. Examination revealed left ptosis. All ocular movements were impaired. The patient could not turn the left eye medially at all. Other cranial and spinal nerves were intact. The hearing was quite normal on both sides. Results of vestibular tests were as follows:

R 45°——1' N very fine, V sl., PP Rt
 Pa
 L 25°——2' 35" N fine, PP Lt
 R no response
 Pa
 L no response

The history was very short in this case, and symptoms had been of rather sudden onset. There was no evidence of tumour or of any other form of degenerative disease. A diagnosis of vascular thrombosis was made. The patient recovered completely.

CASE XV.—V.L. (private patient), aged thirty-nine years, had suffered from giddiness on and off for six months. Attacks lasted up to one week, and he vomited during them; there was no headache. The cranial and spinal nerves were intact. The hearing was normal on both sides. Results of vestibular tests were as follows:

R 46°——1' 20" N reduced, no PP, sl. V
 Pa
 L 46°——1' 50" N normal, no PP, V present
 R 60°——1' 15" very sl. rot. N to Lt., V sl., PP Rt., no V
 Pa
 L no reaction

This patient had well marked polycythæmia. The state of normal hearing was against an early acoustic tumour and also tended to rule out trouble in the ears themselves. The vestibular changes involved both sides and both sets of canals. My conclusion is that this patient's condition is degenerative in type, probably due to arteriosclerotic changes, which arise in polycythæmia. The results of vestibular tests, suggesting central nervous degeneration as they do, have caused very close observation to be brought to this patient's future progress.

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PRIMITIVE MEDICINE MEN.¹

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THE study of primitive medicine men is both interesting and enlightening, for there is some measure of common purpose in their work and in that of civilized medicine men. There are two main problems: what is the function of medicine men in primitive societies, and what makes a person a medicine man in such societies?

The Methods of Medicine Men.

A medicine man must surely give medical treatment, or else why the title? In almost all societies medicine men apply some knowledge, even though it be faulty, of medicine and surgery. In addition, many of the ordinary members of society attempt domestic remedies for ills. Plants are used and in some cases are efficacious; bandages are employed to ease pains and are tightly tied round the aching part. In Australia it is quite common to see a native with string bound tightly round his head for headaches. In the Cloncurry district the inside bark of *Eucalyptus primosa* is bruised and bound very tightly round the chest and body for pains; it is damped and the patient sits in water.²

But while such treatments are sometimes purely medicinal, they are more often primarily magical in motive, or at least have a magical accompaniment and sanction. For example, at Eddystone Island, in the Solomon Islands, the cure for diarrhoea is to tie tightly with a special knot a girdle of prescribed plant stems around the abdomen. The physician then rubs the belly and legs three or four times with the scrapings of certain woods. This is repeated until the ailment ceases, but for not more than four days.⁽¹⁾ This is obviously a case of sympathetic magic, and while the tight girdle and rubbing may ease the pain, they will hardly cure the trouble, and in four days the patient will be cured or dead. The cure for sores on fingers or toes is somewhat different. The leaves of a prescribed plant are pounded up and the juice is applied to the sores on each of three or four days. The patient must not eat certain foods and nuts during the treatment nor until the wound heals. There are also other taboos (liming the face and sexual intercourse), the breaking of which is revealed by the spreading of the sore. In such case the medicine man or leech refuses to be any longer responsible for the patient, and incidentally has an accepted excuse for his failure to cure the sores. The patient must then seek another medicine man. The treatment may be repeated in each of four months, but

¹ A lecture delivered before the Northern Medical Association, Newcastle, on September 26, 1935.

² For this and other treatments used by the Australian aborigines vide E. Palmer: "Notes on Some Australian Tribes", *Journal of the Royal Anthropological Institute*, 1884, page 321; also T. T. Webb: "Aboriginal Medical Practice in East Arnhem Land", *Oceania*, Volume IV, page 91; W. E. Roth: "Superstition, Magic and Medicine", *North Queensland Ethnography Bulletin*, 1908, page 38; G. Taplin: "The Narrinyeri"; in J. D. Woods: "The Native Tribes of South Australia", page 45.

with the juice of different prescribed leaves for each month. The treatment may not exceed four months, whether the wound is healed or not. The medicine man then takes parts of two ceremonial puddings and puts them in a fire as a gift to the spirit which gives him his medicinal power, and to the spirit which gave him his "medical" instruction. This offering is accompanied by the words: "Here is your pudding, spirits, let the sore cease, let it not return." The medicine man then gives a small bit of the pudding to the patient and afterwards all the latter's family eat of it; indeed, if any member does not eat, he will get sores. The medicine man himself does not eat of these puddings, nor does he eat in the patient's house. He receives a big pudding as his fee, which he takes home.⁽²⁾ Now, while the juices of the plants may be efficacious, the virtue of the treatment lies in the presence of the spirit, and the offering and request to the spirit show that the treatment is in part religious. The medicine man is priest as well as leech, though no doubt the procedure is usually very formal, as in magic.

The cure in the same island for "the tired feeling in the morning", when it is associated with the presence of a stranger in one's house, is a magical charm. The medicine man takes four leaves of a certain plant and rubs the patient, saying: "Wake up well", and, walking out of the patient's house by another door, sweeps the sickness (*gumba*) before him with the leaves, saying: "Go away, thou *gumba*, let the man live here, let him wake up well, let not the *gumba* catch him." The leaves are thrown away in the bush.⁽³⁾ There is neither medicine nor religion in this; it is unadulterated magical ritual. The desire is expressed in action.

Massage.

The rubbing of the patient, just referred to, reminds us that massage was practised by many primitive peoples, such as the Polynesians and American Indians (it was also used by the Japanese and the Chinese). The Polynesians use both the gentle rubbing with the finger tips and the kneading movements for the removal of pain and for restoration in case of fatigue. Some methods would perhaps not appeal to us, such as the employment of three or four children to trample over a man when he is fatigued, as happens in Tonga and the eastern Pacific.

Now an interesting feature of massage in early Japan, as in Melanesia, is that the movements are always in a downward direction. The purpose of this in Melanesia for certain is to compel or induce the spirit or badness in the body or limb to quit it at the extremity. In other words, the direction and purpose of the massage are to rid the body of some undesirable thing or power and not to tone it up.

On Eddystone Island again the medicine man uses massage-manipulation so much like our own that we might regard it in the same light; but as a matter of fact, its purpose is to act upon an imaginary octopus. In a case observed by one of our own physicians the medicine man recognized

that the pains were caused by an octopus which was residing in the patient; he "could tell this by the shape; moreover, in the octopus complaint a man does not vomit and can eat a little". The medicine man kneaded the patient's stomach very deeply, rubbed his hands and blew upon them; having repeated this process, he warmed and pressed a leaf very deeply into the stomach, which he then rubbed. The patient sat up and the medicine man kneaded the stomach with a movement such as that used in diagnosing tumour, and at the same time uttering a prayer, such as: "Be favourable, thou spirit, thou octopus, let live this man, be favourable." There was more rubbing and blowing; and there were also certain restrictions of the patient's activities during the time of treatment.^{(4) (5)} Thus the action and purpose of the massage are the logical result of a belief concerning the cause of the illness; the massage is part of a magical treatment, which may nevertheless be efficacious. In other cases of quite useful massage the object is to remove some object, by sleight of hand, from the abdomen or other part of the body—an object which, as we shall see, is believed to be the cause of the illness. Even a sound method of massage which has been introduced may be modified or used *in toto* for this purpose.

Trephining.

Another remarkable method of treatment, this time surgical, can be understood only on the basis of the people's views regarding physiology. This is trephining or trepanning—a very ancient and also present-day primitive practice. Thus in one neolithic grave in France, which is some thousands of years old, eight skulls were found, the owners of which had been subjected to this operation during lifetime, and in most cases with success, for the margins of the openings are healed over. This surgical feat was also successfully performed by ancient Britons and Peruvians as by the modern primitive inhabitants of New Ireland and of Futuna in the New Hebrides. Thus five New Ireland skulls were presented to the Royal College of Surgeons, together with sharp obsidian flakes used in the operation, and the vegetable bandage which was applied to secure the dressings over the wound. Sir Arthur Keith suggests that the operation was performed to relieve headache, or in some cases to allow the demon of insanity or epilepsy to escape. We know that in the thought of primitive peoples the head and its parts are especially associated with a person's life, and Keith is right in maintaining that the operation is the result of holding certain beliefs concerning the constitution of the human body.⁽⁶⁾ Once again the primitives are quite logical, if their premises are granted.

Trephining, however, was practised in the New Hebrides as a means of trimming a broken skull and not in order to let the pain or demon out. When a person's skull was damaged in warfare "the broken bone was laid bare by cutting through the skin and flesh, and scraped each day with a shell, a little at a time, as the patient could bear it, until it was all removed, and then the wound was

allowed to heal". Glass was later used instead of shell. One man upon whom this operation was performed was still alive thirty years later.⁽⁷⁾ We can only express our amazement at the skill of the medicine man and at the fortitude of the patient.

But though trephining may here seem to have nothing to do with animistic or mystical interpretations of pain, we cannot be sure of this, for in the same region something approaching an animistic conception is present even in the treatment of fractures. Splints are used, but the medicine man converts a simple fracture into a compound one by making an opening near the seat of fracture to "let out the bad". Unfortunately this interpretation of the human constitution and the consequent treatment frequently result in suppuration and so the fracture takes months to heal.⁽⁸⁾

Incisions and Blood-Letting.

Incisions and blood-letting have likewise in many parts a similar quasi-animistic diagnostic basis. They are widely associated with the ceremonial life. Blood is deliberately and ably drawn from an arm vein for ritual purposes; for instance, a newly initiated man is made a member of the community or lodge by being covered with the blood of full-members or by drinking of their blood. On other occasions the blood is drawn to give strength to the sick or aged. Blood is likewise drawn from other parts of the body (penis) for ritual purposes; in Australia, for example, it is obtained for such purposes by subincision, though in another region the same practice (subincision) has a therapeutic object. Incisions and gashes are regular parts of mourning customs. On the other hand, incisions over the seat of pain to "let the pain out" constitute a widely used remedy. The purpose of an operation is now ceremonial and religious, and at another time or place, medicinal. This is true also of circumcision. It is not easy to decide which use came first in human history; in some parts, for example in Polynesia, the medicinal use may have been introduced and then incorporated into religious practices, but on the whole the ceremonial customs are probably the oldest.

Beliefs on which Treatment and Practices are Based.

Now the point which we have reached is this: primitive peoples have a number of ordinary secular remedies and treatments for various ills and accidents—herbs and medicines, splints, trephining, massaging and blood-letting, to which we could add counter-irritants and vapour baths. But in most cases these treatments are first based on an animistic or mystical interpretation of the human constitution and its ills, and secondly they are associated with magical or religious ritual and beliefs.

For all this they may be quite efficacious. Further, given the original interpretation of the body and its life, the primitive treatment—physical, magical and religious—is perfectly logical. We must remember that our treatment of different diseases has varied according to our views of the body and its ills. Our

physicians used to diagnose the dispositions of the "humours" of the body and treat their patients accordingly. Further, as one territorial administrator said, before judging primitive treatments:

One must remember that in our own lands no very great lapse of time has passed since every evil involved the invocation of some particular saint; quinsy being cured by Saint Martin, insanity and vertigo by Saint Nazarius, dropsy by Saint Quentin, abscesses and scurvy by Saint Eligius and Saint Julian, etc.⁽⁹⁾

Today we speak of germs and infection, functional and organic disorders, of neurasthenia and breakdown, and we treat by injection and isolation, medicine and operation, psychiatry and change of air, and so on. According to our interpretation and diagnosis, so will be our treatment. Needless to say, there is room for error; but we are logical, just as the primitive medicine man is. The latter, however, is not only a leech (physician or surgeon); he is usually also magician or priest, whereas in our society these professions are separated. The magician, indeed, is in our society almost tabooed, unless we so classify some of the charlatans, Christian Science practitioners, mental healers, one-cure-for-all-ills experts, and such like, who seem to gull our still primitive public, nominally civilized though it is.

Causes of Disease.

What then are the causes of disease according to primitive peoples? Briefly, there are three: (i) gods and spirits, (ii) human agents, and (iii) what we call natural causes. The last-named agency, however, is scarcely recognized at all in some regions, except for trifling and ordinary troubles, and even then the mystical cause is in the background, whereas it covers most of the field according to our ideas. Still we do speak of the act of God, at any rate legally, while human agents do cause disease and pain by poison and injury, careless motor car driving and thoughtless social behaviour. To return to the primitive, they recognize, broadly speaking, two main causes of disease, one of which is wholly supernatural, while a human agent enters into the other and works by magic: (a) The god or spirit of the dead or of Nature usually inflicts disease because the person has broken some rule which has a supernatural sanction. To steal from a house or garden in which the sign of protection by some spirit or on which some conditional curse has been put, will bring a certain prescribed disease; so, too, will entering some forbidden sacred place, perhaps the abode of the spirits. Again, in some societies the breaking of important social rules, such as those relating to marriage and economic activity, stirs the wrath of the supernatural powers and illness follows. (b) On the other hand, human beings with a knowledge of magic can cause sickness in others by certain rites and spells. In some societies any person can obtain a knowledge of such rites and use them when he is offended with some individual; or it may be that only certain less harmful rites and spells can be used by the public in general, whereas sorcery and witchcraft are the prerogatives

of specialists, sorcerers, witch-doctors and witches, who acquire their knowledge by right of inheritance or of payment and by training.

But whether diseases be caused by supernatural or human agencies, it is the work of the medicine man to diagnose the illness, give the appropriate treatment, which is probably almost wholly magical in nature, and in some cases to ascertain by means of divination who caused the illness. In some places all this is the work of a priest or shaman rather than a medicine man.

But exactly in what ways are diseases caused by supernatural and magical agencies? Very often the soul of the person is abstracted or it may be caught while he is asleep. This may be done by ghosts, demons or sorcerers. In such a case the victim is apt to be overcome by lassitude and to be a prey to various illnesses or insanity, and indeed, unless the soul be brought back, death must follow. Thus a man of the Wurinjerri tribe, Victoria, was at the point of death because his soul had departed from him. A medicine man pursued it and caught it just as it was about to plunge into the sunset glow. He "brought it back under his opossum rug, laid himself down on the dying man, and put the soul back into him, so that after a time he revived". In some Congo tribes illness means that the person's soul is wandering at large. The medicine man is employed to capture and restore the soul. He generally chases it to a tree and, in the presence of all the people, has the branch broken off on which he says the soul is lodged. This is brought to the patient's hut, where the medicine man performs a rite for the restoration of the soul to the sick man.⁽¹⁰⁾ This catching of souls can become a highly profitable business. Some medicine men in West Africa "keep regular asylums for strayed souls, and anybody who has lost or mislaid his own soul can always have another one from the asylum on payment of the usual fee"—and that way lies health.

Illness and ultimately death are caused in parts of Australia by the taking of a person's kidney or caul fat. Belief in this process, which usually is merely the explanation of a sudden fatal illness, will be mentioned again in connexion with the making of medicine men in Australia. It is either imagined to be the work of sorcerers, or else the fat is actually extracted by a successful warrior who desires it to charm his weapons. All that the medicine man can do is to indicate who caused the death in this way and so initiate an expedition of revenge.

So much for the abstraction of the soul or some vital part as a cause of illness. The opposite process may also be a cause. A spirit or animal or some object may have entered the body. The belief that illness is caused by spirit possession is widespread. Exorcism is the natural method of treatment, and no doubt the ritual makes such an impression on the mind that it does sometimes effect a cure. It may be the spirit or the double of some animal, such as an octopus, snake or bear, which has taken up its residence inside the patient and which must be removed by means of massage, ligature, poultices

and medicines together with a magical rite.¹ When, however, the disease is caused by human agency, some object, such as a piece of quartz, bone, charcoal, or suchlike, is believed to have been inserted by magical means—incantations and bone-pointing are common methods. Of course, as far as we are concerned, there is no such inserted object or, if there is, it is invisible. At any rate the illness and the symptoms are present, and since spears and clubs and material objects are the only recognizable causes of pain, sudden or inexplicable pain and illness (for instance, appendicitis, pneumonia) must be caused by invisible spears and other objects. It is rational enough, and after all the germs to which we attribute so many of our ills take a lot of seeing. The work of the medicine man is to diagnose and treat the illness. He does the latter by sucking and rubbing and blowing and by various conjuring devices which enable him to produce the object, the supposed cause of the illness. This restores confidence and frequently the patient recovers; but unless the medicine man does his part there is little hope for the person who believes he has been pointed or sung.

Disease may also be caused by magic's being worked on something that has been in contact with a person, such as his hair or footprint, or on something which is made to represent him. Once again it is the work of the medicine man, with his knowledge of spell and rite, to work the cure.

The Work of the Medicine Man.

In answer, then, to our question, what is the work of the medicine man, we may say: to diagnose and treat illness according to the accepted ideas concerning the constitution of the body and the causes of illness. In this he uses some methods and materials which really are of medicinal and curative value, though he does not always realize this. But in addition he uses a lot of magical ritual and formulæ which have no such value and yet are of psychological value. When the medicine man, after rubbing, throws away the illness, though it be invisible, or when he produces some object, presumably from the seat of pain, and the patient believes that the source of trouble has been removed and that therefore he must get better, he naturally exerts his will to live. The medicine man may believe in the former case that he really is throwing away the disease, just as he may believe in his powers to recapture a soul, though he knows his own trickery in the extraction of magical substances; and yet even here he often believes that his action is a necessary part of the cure. Certainly if he falls sick he lets other medicine men practise the same rubbing and sucking and cunning production of blood and objects, and believes something of value may really have been done.

His great task is to generate faith in life; this is done by performing the expected and accepted rites in a thorough manner and in an atmosphere

¹ For various diseases and the demons or doubles involved in each case, which have to be exorcised, vide R. F. Fortune: "Sorcerers of Dobu", page 144.

of dogmatic certainty. So the primitive medicine man cultivates the requisite bedside manner and, indeed, looks preternatural—as, of course, he should, seeing that he is often in league with and assisted by spirits, and that he has a fund of secret knowledge and bluff which is not known to his patients.

All this is true in a sense of our civilized medicine men, who endeavour to generate faith in life by their manner, their airing of knowledge, and their writing of prescriptions. Even now, with all our advances in medical science, there must sometimes be an assumption of knowledge where no knowledge is, in the hope that by restoring confidence and faith the life force within the patient will be victorious over the disorder by which he is afflicted.

Here, too, comes in the work of the priest of religion in these days. Whether the modern medicine man believes in religion or not, he would show an abysmal ignorance of the human mind if he did not realize that for the majority of mankind religion still has an important part to play in many curative processes. The confession and absolution relieve the patient of any feeling of separation from God, while the ritual of prayer and sacrament brings him into union with what he believes to be the source of all life; and so faith in life and in the work of the physician is strengthened. Moreover, quite apart from the historical and philosophical bases of religion, human nature is much the same in our own civilized society as it is in primitive societies; at least, this is seen to be so once you probe down to the fundamental urges of life, preservation and procreation. We, especially with regard to some of our social customs, have advanced somewhat from our primitive ancestors; but we have not severed the links with the past in mental and social life much more than we have in our physiological make-up. Many of us are on some occasions not far from the primitive; most of us still need that association of religion and medicine which is characteristic of the work of the primitive medicine man.

The primitive medicine man is the mediator of life; this will be clearer when we have noticed what makes a person a medicine man. But his work is not a free gift. Primitive man and society understand as well as we that faith in the value of a treatment has some relation to its cost. The fees charged or gifts expected are often very heavy in primitive society, as they are in our own, and sometimes they are not commensurate with the services rendered. Making exorbitant profit out of man's extremity is a vicious practice and undermines faith. But what primitive man pays for is not just the skill of the medicine man; it is his personality.

Though in primitive society, as in our own, faith in medicine men may vary, yet in general it is strong. Nor is contact with civilization sufficient to destroy that faith in a hurry. At Mount Margaret Mission, near Laverton, Western Australia, I saw a young, sophisticated native being treated by a medicine man. True, in the midst of the treatment he asked me for a pill, but he did not send the old

medicine man away. The latter rubbed the patient's abdomen, and as if taking something from it in both hands, he walked solemnly away a few strides and jerked his arms and hands out to throw this something away. He repeated the process a number of times. At another mission in north-west Australia the missionary was efficiently treating an old man for a nasty illness and giving him medicines which were gladly taken. But in between times the native practitioner was in attendance, restoring faith.

In the transition stage from the primitive to the civilized, we may give great physical assistance, but we cannot restore the will to live, the belief that the cause of illness has been removed. In the eyes of the natives our medicines treat only the symptoms; it is their own medicine man alone who can deal with the spiritual, magical and supernatural causes of the condition.

Other Functions of Medicine Men.

Primitive medicine men, however, are not only leeches or medical practitioners; they have other parts to play in society, more particularly in the maintenance of social justice. In the first place they frequently conduct inquests to ascertain the cause of death, and also the person who worked the magic leading up to the death. Thus they act as medical officer, coroner and judge. They may be assisted by other old men, who then correspond to our jury. The methods of inquiry are hardly scientific; they are usually divinatory. The medicine man sees the spirit of the dead man hovering round his magical "murderer"; or, having drunk the appropriate medicines, he dances until through inspiration he can announce the "murderer", though probably only in very indirect ways. There are many other methods, such as asking the corpse, which makes certain prescribed movements—with the voluntary or involuntary help of the bearers of the bier—when the name or country of the "murderer" is mentioned; or making tests with the deceased's hair. But perhaps the most interesting methods are those associated with surgical *post mortem* examinations such as are practised in parts of Australia. On the southern reaches of the Murray River the corpse was tightly bound in cloths and skins and put on the bier. Then, with the men standing round, two men "proceeded to cut a slit of about ten inches long through the swathing cloths above the belly; through this opening they removed the arms, which appear to have been crossed there, laying them down by the sides inside the wrappings. . . ; having warmed a handful of green boughs over a fire, they thrust them in through the opening in the cloths, upon the naked body of the corpse; after a little while these were removed and one of their sorcerers made an incision of about eight inches long in the abdomen. Having pulled out the entrails and peritoneum, they were turned over and carefully examined", whilst the bystanders wailed and cut themselves more violently than before. After some time "a portion of the omentum was cut off, wrapped in green leaves, and then put carefully away in a bag. The entrails were now

replaced, a handful or two of green leaves thrust in above them, the cloths replaced, and the body again bound up ready for interment." If a cicatrice appeared on the omentum, it would be a sign that the death had been caused by sorcery and must be avenged.⁽¹¹⁾ The following example from the Lower Tully River, North Queensland, is of similar interest. The corpse of a distinguished male was kept for some days until well swollen up, when the outer skin was washed off and the hands were tied together. Then, about sunset, an old person, usually a medicine man, sat astride the body and made the following incisions: one right across the top of the belly and one down each extremity of that incision, so as to allow of the flap of skin being turned downwards. He removed the stomach and wrapped it up in the deceased's bark blanket and held it in front of him as he crouched along to within sight of those assembled. In the pouch was found the "something" with which the deceased was doomed. The corpse was then cremated.⁽¹²⁾

Incidentally such methods of inquest must have taught the medicine men a good deal about human anatomy. But there was more in the inquest, whatever the method employed, than the mere chance of a cicatrice appearing on the omentum, the hair breaking, the corpse moving at the mention of a certain name, or an inspiration resulting from the fatigue of a dance, and so on. Medicine men in all communities are fully acquainted with the character and worth of the individual members, and with their mutual fears, hates and suspicions. The verdict is therefore coloured, if not conditioned, by this knowledge. Moreover, they are guarded in their pronouncements, and endeavour not to make rods for their own backs. This is true even in such a primitive society as the Australian, but is even more so in sophisticated societies such as are found in Africa.⁽¹³⁾

Secondly, they are emphasized in some communities to find the evil-doers in various crimes and offences by divinatory processes or by applying ordeals.

Moreover, medicine men in some societies are an important stay of the chief's authority, being employed to punish by magic those who offend. New Guinea provides examples of this.

Now civilized medicine men are also employed for these purposes; their *post mortem* work and opinions on the causes of illnesses where foul play might be suspected, and on conditions leading to accidents are essential in inquests and in trials. Moreover, they play a more direct part in the maintenance of law and order in those places where the medical officer is also magistrate. In addition to this, the medical practitioner, by the word in season, quietly or sternly given, can, if he choose, be a powerful agent for social righteousness.

There is no need to develop here the theme of the medicine man's being in some societies the king, or rather of the king's possessing especial magical powers on which depend the health of his subjects and the fertility of the crops; nor is it necessary to

describe the function of the medicine man in gardening or economic activities. Sufficient is it to say that the knowledge of magic which enables him to give health to man enables him also to give it to Nature by causing the rain to come and the pests to go, and so on. The primitive world is a mystical, animate, personal world, and there is no hard and fast line between life in man and in Nature. And so the weather "doctor" also treats man's ills and does so by the same processes and on the accepted basis of a common animistic, mystical or totemistic principle in both man and natural species and phenomena.

Unfortunately medicine men can sometimes be antisocial; they can, and will for a consideration, cause illness and death. True, they can actually do no such thing by their magical practices; yet the power of suggestion is strong, and as a result they do sometimes exercise terror over the lay folk and are extortionate. This makes them a disintegrating force in society. However, there is always the possibility of the wrong use of knowledge and power, no matter how good the social organization; and perhaps sometimes a case might even be made out against civilized medicine men.

The Making of Medicine Men.

There is a final and interesting question: What makes a medicine man? Whence and how does he get his power of life-giving? There are two sides to this question, and both are important. In the first place there is the element of training in the art, in the profession, in a knowledge of herbs and splints and massage, of spells and rites, of sleight of hand and ventriloquism and the other devices which are resorted to. But that is not enough; the future medicine man must not only be taught, he must be "made", initiated, and so endowed with power for his work. This power is usually associated with the permanent or temporary possession of certain substances or spirits. Thus an African "Zande witch-doctor is essentially a man who knows what plants and trees compose the medicines which, if eaten, will give him power to see witchcraft with his own eyes, to know where it resides, and to drive it away from its intended victims . . . His prophecies and inspiration are from the magic inside him".⁽¹⁴⁾

In Australia, however, the powers of medicine men are mainly associated with the possession and use of quartz crystals, pearl-shell, magical stones and spirit animals (individual totems), all of which are supposed to be in the practitioners' "insides". They got there during initiation and are a sign and means of the new life and power with which he was then endowed. Now this power comes from above, namely, the sky-world, the bridge to which is the rainbow. Through this power the medicine man, at his initiation, and later also, goes to the sky to receive knowledge and quartz crystals from the culture hero, or heroes, who are there. It is most likely the colours in the quartz crystal and in the pearl-shell which make them symbols of magical power, for they are the colours of the rainbow.

Sometimes these magical substances are gathered at the foot of the rainbow in waterholes. But what is also interesting is that the rainbow is a serpent, a source of power and life; and is not the serpent still a symbol of the medical profession and its classical god?

Now this power from the sky-world cannot be acquired in ordinary ways, but only through an initiation which includes a ritual death, a journey to the sky, endowment with the new life, and a rising again to mortal life and activity. Other medicine men may play a part in this ritual or it may be solely the work of spirits or ghosts. But it is the general pattern of the ritual death and endowment with magical substances which is of most interest from a surgical point of view. It comprises a ritual death or trance, the making of an incision through which the postulant's "insides" are removed and replaced by a new set of mystical insides together with magical substances and spirit-snakes or other animal powers, the closing of the wound so as to leave no sign, and a restoration to life. In the Binbinga tribe, for example, the postulant was cut open right down the middle so that his "insides" could be replaced by a set of spirit "insides" together with magical substances. He was then restored to life, and when he returned to the camp after having been taken up to the sky by a spirit, he found the natives mourning for him. In the Kaitish tribe a medicine man "killed" the postulant with crystals, some of which were thrown so as to pass through his head from ear to ear, cut out his intestines and other internal organs, and placed stones in his body, arms and legs. He then covered his face with leaves and left him until his body was swollen up (a stage in some burial rituals), after which he put more stones in him and, patting him, caused him to jump up alive. On waking up, the postulant thought he was lost, but his initiator explained that he had killed him a long time ago. The new medicine man had completely forgotten his past life.¹

If an abdominal incision, the removal of the "insides", an insertion of something in their place, a closing of the wound, and a restoration to life formed the procedure carried out on a corpse, we should recognize a mummification ritual. This is even clearer when we realize that in many tribes magical substances are said to be inserted also into the arms and legs, as though for packing. It does seem that this ritual is based on a burial ritual, more particularly that of mummification, with which it has so much in common. This inference is strengthened by the form of some of the burial rites in eastern Australia; in these rites the corpse is treated very much as is the postulant in the medicine man rite.² There is the classic instance

of mummification in Torres Straits, whence apparently the custom spread to eastern Australia.

The procedure in fat extraction, already referred to, is also important in this connexion. Out of nine procedures in different tribes, the incision is made in the back in three, in the side in three, and in the abdomen in two. Packing of the wound is recorded for three tribes, in two of which packing of the corpse was a burial practice. This making of incisions through which a part of the inside is extracted and packing is inserted, after which the wound is closed (by sewing in one case), suggests again the practice of mummification. The suggestion is strengthened by the accompanying practice in two tribes. In one, the Buandik, the medicine man inserted a stout blade of grass into the nostril, twisted it, and drew something out. In the Kungganji tribe the victim's head was pierced with a bone just above each nostril for the purpose of extracting the life blood and the tongue.^{(15) (16)} The point is that mummification ritual as practised in ancient Egypt and until comparatively recently in the Torres Straits, included the extraction of the brain through the nose.^{(17) (18) (19)} If this general argument be sound, it is only to be expected, as was the case or belief, that the victim who for the time being was unconscious, should wake up and live for a time, and also it is appropriate that fat-taking should be one of the powers of medicine men.

The point I have tried to make is that the ritual of the making of medicine men in Australia, which, like all other initiation rites, is a death and restoration to life, presents a mummification pattern, and that this is not extraordinary when we remember the mummification burial of eastern Australia and the Torres Straits and the procedure in fat-taking. Needless to say, all this is only symbolic so far as the making of medicine men is concerned, though the postulant, weakened by his fasting and discipline, and sometimes in a state of trance, may believe that such has been his experience. It may be that the initiating medicine men did go through the actions of making the incisions; they actually did press the quartz crystals into his abdomen and limbs and in some cases pierced his tongue. But the marvellous thing is to find quite similar ritual patterns described by medicine men of widely separated tribes.

I must leave this aspect of the subject with a final emphasis on the primitive belief that training for the profession is not enough; there must also be an initiation into another life, so that the would-be practitioner may be endowed with life-giving power.

The primitive medicine man is no mere quack, nor is his profession easily come by. He must be trained and disciplined, and then he is able to perform valuable curative, life-giving and social functions. The modern medicine man, in spite of all his knowledge, is surely a lineal descendant of the other in his psychological, physiological and social work, and may learn something from him of the consecration which should be the *sine qua non* of that work.

¹ For these two rituals, vide Spencer and Gillen: "The Northern Tribes of Central Australia", pages 480 and 487.

² There are many references to these burial rites in addition to the two already mentioned. Vide Roth, *loc. cit.*,⁽²⁰⁾ and J. D. Woods, "The Native Tribes of South Australia". I have recorded similar rites for the "making" of medicine men in north-west Australia.

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THE SUVA NATIVE MEDICAL SCHOOL.

By SIR JAMES BARRETT.
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THE Suva Native Medical School is a remarkable institution which seems in some fashion to have escaped not only public notice in Australia, but also the attention of the Australian medical profession. Although the school, in some form, has been in existence for many years, more recently a number of distinguished anatomists, physiologists and medical practitioners have visited it, and in some cases lectured to and examined the students. Some of their comments have been eulogistic, and will be referred to later. I propose therefore to set out briefly the facts relating to the objective of the school and the methods by which the results are obtained.

The school itself is situated in the fine Suva Memorial Hospital, and the clinical instruction of the students is given in that institution. It is quite obvious that the native inhabitants of the South Pacific islands cannot in any circumstances afford to pay European medical practitioners, and yet some attempt has to be made to make them adopt the methods of Western medicine, that is if they are to be saved from depopulation. Accordingly, fifty years ago this school was established for the benefit of Fijians.

After this native practitioner system had been operating for some time in Fiji, the Rockefeller Foundation made a critical examination of its methods with the view of extending it to other islands in the Pacific, and by introducing ideas of Western medicine of endeavouring to arrest any tendency to depopulation. In this development Dr. Lambert has been actively concerned. The Rockefeller Foundation accepted the scheme, made generous contributions to it, and arranged that natives of several groups of islands could be trained at Suva.

As they speak different languages, a thorough knowledge of English was made a requisite for entry into the residential school at Fiji.

What, then, has been the result? After graduation the native medical practitioners return to their homes as government medical officers.

Many Europeans who have tried to apply methods of Western hygiene or medicine to relatively backward people know the difficulty. These backward people either do not understand or they think the European crazy, and nothing happens except under compulsion. But when the problem is tackled by one of their own race, speaking their language and understanding their mode of thought, good results are possible.

Let us set out what has been accomplished. At the present time eighty-four native medical practitioners are employed in the Western Pacific, distributed as follows:

Fiji	56
Samoa, western	9
Samoa, eastern	0
Tonga	4
The Cook Islands	2
Gilbert and Ellice Islands	10
Solomon Islands	2
New Hebrides	1

In addition, a large number of native nurses have been trained in Fiji, and the European medical officers report most favourably on their capacity. There are forty-seven obstetric nurses in Fiji. The Suva Memorial Hospital is at present staffed by twenty European and twenty Fijian nurses, and many other nurses are serving in the various Fijian islands. They are conducting infant welfare schemes and the like. Native nurses are also employed in British Samoa.

At the present time thirty-seven students are undergoing training at Suva. The curriculum is interesting. It has recently been extended from three to four years. The entrance examination is based on the New Zealand proficiency examination and, as indicated, must include a thorough knowledge of written and spoken English. The first year is an elementary science course, now including elementary biology. The remaining three years are chiefly clinical.

The cost of the school is less than £3,000 a year, contributed in various ways. The graduates become government medical officers and practitioners at salaries commencing at £60 *per annum* and rising to £150. Their efficiency has been brought under my notice by Europeans who had occasion to employ them in remote islands and places in the absence of any European medical practitioner. Anyone who visits the school and addresses these highly intelligent Polynesians (as they are for the most part) need have no doubt of their capacity when trained.

Perhaps the best comment is that furnished by Professor Buckmaster and Professor Wright, who visited the school when returning from the conduct of the primary F.R.C.S. examination in Australia and New Zealand. Their report read as follows:

The Hospital and Medical School at Suva for natives of Fiji, Samoa and other islands is really a wonderful place to find in the South Pacific. We not only saw all over the Hospital, but Wright and myself conducted a short class in anatomy and

physiology in the school and both thought the students equal to what we might have expected to find in an ordinary medical school in London. Indeed we were both astonished at the information they had acquired. I ask how many Englishmen know anything about this remarkable hospital in Fiji?

The school publishes a journal called *The Native Medical Practitioner*, to which, by invitation, I have had the honour of contributing. It aims now at post-graduate education. Is it not obvious that an honest and well-considered effort is being made to introduce Western medicine into the Pacific islands at a cost which the circumstances render possible? My own visits to the school impressed me just as Professor Wright and Professor Buckmaster were affected.

For some of the details I am grateful to Dr. McPherson, Acting Tutor of the School, and Dr. Pearce, Chief Medical Officer of Fiji. I am sure that any medical practitioner passing through Suva will be welcome at the school.

Reviews.

DISEASES OF CHILDREN.

THE popularity of the Recent Advances series of books cannot fail to be enhanced by the publication of the third edition of "Recent Advances in Diseases of Children", written by W. J. Pearson and W. G. Wyllie.¹

It is five years since the previous edition was published, and in consequence it has been necessary to make many additions and several alterations to the text; but this has been attained without much increase in the size of the book, whilst the excellent arrangement and discursive style formerly used have been retained.

Throughout, emphasis is laid on modern conceptions of pathogenesis, and basic principles of modern physiology are primarily considered in referring to treatment. The importance which the authors place on these methods of approach to a study of disorders of infancy and childhood, may be assessed from the fact that it has been necessary to enlarge and subdivide the original introductory chapter into two parts, dealing respectively with general principles in the study of disease, and physiological principles in treatment. In addition, almost every chapter has several introductory paragraphs dealing with physiological aspects of the system to be discussed.

Necessarily, several chapters are required for the consideration of ailments affecting the infant and its development, and the pathogenesis of diseases of the newborn is critically discussed. The problems associated with prematurity are ably presented, and it is pointed out that the chances of survival are dependent on weight, length, general appearance and signs of vitality of the infant rather than on the actual time factor. Because of the lack of fresh air and possible incubation of bacteria in an incubator, a padded crib and hot water bottles are preferred, and useful details with regard to the preparation of the latter are given. The feeding of the premature baby is elaborated with due consideration of water and caloric requirements.

The sections dealing with the feeding of infants and older children could be read with benefit by all physicians as a model of the method to be used in approaching and

dealing with dietetic difficulties; and whilst there is perhaps a tendency to over-emphasize the deleterious effects of modern methods of preparation of foodstuffs, it cannot be denied that there is too great a tendency to neglect the alterations in dietetic value which the authors deprecate.

Special types of diet, such as lactic acid milk, butter-flour mixtures, and thickened feedings for infants, and modifications of diet for older children, for example, alkaline and ketogenic diets, and diets in obesity, diabetes and asthma, are fully dealt with. Actual examples are given in the latter instances where considered necessary for clarity and the convenience of the reader.

In considering summer diarrhoea, the authors state that there is "little ground for assuming that infection plays a primary part" in its causation. This will not find favour in Australia where it has been proved that infection with dysentery bacilli is a common cause of the condition; but the section is very useful from the therapeutic aspect, although there is no mention of the beneficial effect of the administration of sodium sulphate in summer diarrhoea and dysentery.

Following Kinnear Wilson's lead, fits in several forms, including convulsions, are grouped as "the epilepsies" instead of being treated as unrelated entities. Other diseases of the nervous system are also discussed, including epidemic serous meningitis and other recently described conditions. Pink disease has been included in this division.

The value of the Mantoux test is critically discussed in the chapter on skin tests. In contrast to the previous opinion it is now emphasized that allergy is not an indication of immunity, for the former can be produced by inoculation with nucleo-proteins derived from tubercle bacilli, resulting in a positive response to the Mantoux test without there being any immunity.

Of outstanding value is the chapter dealing with diseases of the blood and lymphatic tissues, which has been largely rewritten, and which gives a concise picture of the present conception of affections of the erythropoietic system. The other sections retain the merit of the previous editions.

There is no doubt that the authors have accomplished a difficult task in a very able manner, and the publication is such that it cannot fail to appeal and be of great value, especially to practitioners and those desirous of refreshing their memory of basic principles of the pathogenesis and physiological methods of treatment of diseases of children. References are ample, and recent additions to knowledge are well epitomized and discussed.

OPHTHALMOLOGY IN GENERAL PRACTICE.

AN excellent little book on ophthalmology, by O. Gayer Morgan, has appeared in the series of "Pocket Monographs on Practical Medicine".¹ It contains fifty-eight pages, which are well illustrated. It is easy to understand and it is remarkable what a wealth of information has been put into such a small space.

After a short description of how to examine an eye come the various external diseases under appropriate headings, and their treatment is concisely explained. The sections on the iris, the ciliary body and on glaucoma contain what the general practitioner should know. Changes in the lens are dealt with in two pages, and then come conditions in the optic nerve and retina, a knowledge of which is often essential to a full understanding of the patient's general condition. The concluding pages deal with squint and symptoms caused by error of refraction. The book should help the general practitioner to decide which patient to treat himself and which to refer to the ophthalmologist; it should thus serve a very useful purpose.

¹ "Recent Advances in Diseases of Children", by W. J. Pearson, D.M., F.R.C.P., and W. G. Wyllie, M.D., F.R.C.P.; Third Edition; 1935. London: J. and A. Churchill, Limited. Demy 8vo., pp. 576, with illustrations. Price: 15s. net.

¹ "Pocket Monographs on Practical Medicine: Ophthalmology in General Practice", by O. G. Morgan; 1935. London: John Bale, Sons and Danielsson, Limited. Foolscape 8vo., pp. 57, with illustrations. Price: 2s. 6d. net.

The Medical Journal of Australia

SATURDAY, NOVEMBER 30, 1935.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

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POST-GRADUATE TEACHING IN NEW SOUTH WALES.

LITTLE attention was paid to systematic post-graduate teaching in Australia until the Victorian Branch of the British Medical Association took steps to found the Permanent Post-Graduate Committee that has for many years met the needs of the medical profession in Victoria. The Melbourne committee as an independent body is answerable to no supervising authority and it has control of its own funds. The advantages of the arrangement are obvious; and in other States committees have been formed on somewhat similar lines. The New South Wales Branch of the British Medical Association in the first instance formed a committee as part of its own organization; but later it followed the example of Victoria and was responsible for the founding of the New South Wales Permanent Post-Graduate Committee as an independent body. The funds by which this committee was enabled to launch its activities were advanced by the Branch. For some years the Committee has carried out most useful work—regular refresher courses in general medicine, surgery and obstetrics, have been held in Sydney and sometimes in country centres; courses in special subjects, such as ophthalmology, have been

arranged; and eminent lecturers have been brought from other places to speak to Sydney audiences. With the increase in the work of the New South Wales Permanent Post-Graduate Committee it became evident that its organization would have to be expanded if the growing needs of the medical profession in the State were to be met. The most pressing need was an arrangement by which a body in authority would be able to provide for continuous instruction in suitable surroundings. The preliminary steps to satisfy this need have been taken.

Elsewhere in this issue appears an announcement of the constitution of what will be known as the New South Wales Post-Graduate Committee in Medicine. The New South Wales Permanent Post-Graduate Committee goes out of existence; it is in fact incorporated in the new body under the ægis of the University of Sydney. The formation of the new body is an indication of the far-sightedness of the University authorities and of the desire of the old Post-Graduate Committee to establish post-graduate teaching on a firm basis. The occasion cannot be allowed to pass without a tribute to the generosity of the New South Wales Branch of the British Medical Association in making over to the new body the funds of the old Post-Graduate Committee, for in the terms of the constitution of the latter body all funds held by it were, when it ceased to exist, to revert to the Branch. The new body will be in effect the same as the old; but it will have university prestige and authority behind it. Organization such as that involved in the planning of courses of instruction, will be more easily carried out by the new body than it was by the old; and presumably the resources of the new body will be greater. Practising members of the medical profession, while they will be appreciative of what is being done for them, will therefore expect efficiency and a wide range of activity.

In order to be effective the new committee will need to have at its disposal a place in which continuous teaching can be undertaken. On many occasions we have in these pages pointed out that medical graduates should be able to undergo in Australia courses of training that would fit them

to undertake the practice of special branches of medicine. This can be done only by an apprenticeship system and by continuous study under the guidance of a capable teacher. This, of course, holds good also as far as general medicine and surgery are concerned. The present time is opportune for the establishment of a post-graduate hospital in Sydney, either by building an entirely new institution or by the adaptation of a hospital already in existence. Rumours are current that something of the kind is intended. Whatever is done, it would be well to have one hospital as a main post-graduate centre; but it would not be necessary to restrict all post-graduate teaching to the confines of that one institution. We know of no hospital in Australia in which adequate training could be given in every branch of medicine. The present objective should be to establish a post-graduate hospital without undue delay and to adapt it to requirements as far as its location and general character made adaptation possible. Later on additional facilities might, if necessary, be sought elsewhere. Clinical material that cannot be found in one place can generally be found in another. One other consideration, possibly the most important, remains. The success of any post-graduate teaching depends on the ability of the teacher to teach. When the New South Wales Post-Graduate Committee in Medicine is choosing its future teachers it must be influenced by no consideration other than ability to teach. When the staff of a post-graduate teaching hospital is being chosen, the same consideration alone must apply. No so-called vested interest, no unwarranted reputation, no seniority, however great, must be allowed to interfere with efficiency. Too often is decadence brought about by unwillingness to refuse to appoint or to remove from office some incapable person whose only claim to consideration is his self-assertiveness.

Current Comment.

THE TREATMENT OF TETANUS.

THE Great War added much to our knowledge of the treatment, especially the prophylactic treatment, of tetanus. In the four years of conflict the "shot in the buttock" of tetanus antitoxin saved the lives

of countless soldiers, living and fighting in the infected soil of France and Flanders. An opportunity for a mass experiment in the prophylaxis and active treatment of tetanus was offered and modern medicine proved equal to the emergency.

A review of the literature on the subject of tetanus, covering the period between the ending of the War and the end of last year, confirms the belief that we still await a fresh advance in fighting one of the most horrible of all diseases. At the end of last year it was held, for instance, that no one route was much superior to another for the injection of antitoxin, so far as the end result to the patient was concerned. But it was realized, none the less, that after injection into veins or muscles, the antitoxin was more quickly available, that initial doses ranging between thirty and sixty thousand units of antitoxin were none too large, and that sedatives of the newer vintage, such as "Sodium amytal", were worthy of trial, while basal anaesthetics, "Avertin" amongst them, might be useful. Only last year, too, one authority stated that there appeared to be no relationship between the length of the incubation and the mortality rate of tetanus, a pronouncement which appears open to grave question now.

During this present year, Leslie Cole and E. T. C. Spooner, working at Cambridge,¹ have published the results of their investigations into twenty-one cases of tetanus. Cole has concerned himself with the paramount question of effective treatment, while Spooner has busied himself on discovering the fate of injected tetanus antitoxin. The observed cases were divided into four groups. There were those, first, in which a purely local tetanus was apparent; there were those, secondly, in which, although a tonic rigidity had involved the muscles of the jaw, chest, abdomen and limbs, reflex spasm was yet absent or slight; there were those again in which that tonic rigidity passed to a state of spasm at the slightest stimulus; and, lastly, as the fourth member in the group, there were those in which the spasms were unheralded, rapid in sequence or continuous, and accompanied by high fever, cardiac or respiratory failure, and a distressing death. The patients included in the first class, it appeared, had been given an early dose of antitoxin and their wounds were slight; and much the same might be said of the people in the second division. In both the incubation period of the disease was long, and in both recovery was the rule. The sufferers in the third batch hovered between life and death; they were those in whom the incubation period varied between five and fourteen days. The unfortunates of the fourth category were doomed from the start; the incubation period had been four days or fewer, and modern treatment availed them nothing.

He who treats tetanus, says Cole, must aim at three targets: he should strive to prevent absorption of the toxin, he must combat exhaustion of the patient by subduing spasm, and he must see to it that the patient swallows sufficient food. The

¹ *The Quarterly Journal of Medicine*, July, 1935.

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tetanus bacilli must be removed from the wound, or, by the giving of antitoxin, they must be rendered inactive. But always the administration of antitoxin should precede any active meddling with the wound; manipulations about the site of injury send massive doses of toxin post-haste into the circulation, to "fix" themselves to motor nerve cells. Whether better results follow intrathecal, intravenous or intramuscular administration of antitoxin is not yet decided. Ransom has said that the toxins, once reaching the nervous system, are locked up and inaccessible to antitoxin. It seems beyond question that antitoxin introduced beneath the theca cannot, for anatomical reasons, come into intimate contact with nervous tissue until valuable time has been lost; but the circulatory mechanism of the brain and spinal cord is so rich that the curative agent should readily reach it after injection into a vein. Since inquiries into this question have necessitated experiment on various lower animals, it follows that opinion differs as to the merits of the intravenous and intrathecal routes for the administration of antitoxin. Sherrington, Park and Nicoll, Gottlieb and Freund, as a result of animal experiment, preferred the intrathecal route. Florey and Fildes, employing Weed's method of changing the direction of flow in the cerebro-spinal fluid, considered that there was nothing to choose between the intrathecal and intravenous modes of approach. Clinical opinion, till recently, has been equally mixed. On the whole, medication through a vein is now most widely adopted. By no other journey will the antitoxin get so rapidly into the circulation or reach the nerve cells.

Cole, while treating his twenty-one patients, at first gave antitoxin by all available routes, but later confined himself to injections into the veins. Incredible as it sounds, he administered 200,000 units of tetanus antitoxin in one single dose at the moment of the patient's admission to hospital. Nothing untoward happened. One patient experienced a slight "collapse", two others developed a serum rash within the first fortnight after the injection. Apart from these incidents there was no cause for anxiety; and Coles believes wholeheartedly in the efficacy of a single dose of antitoxin, given at the earliest possible moment. One week after this initial injection, says Spooner, ten units of antitoxin per cubic centimetre (which means a total of 50,000 units) are still to be found in the circulating blood. One week later between three and five cubic centimetres may be discovered there. From this observation it follows that as a prophylactic, even in badly wounded patients, 1,500 units are protective, and the value of further injections before the tenth day of the disease is at least doubtful.

In tetanus the mechanical disturbance of the infected wound may pour toxin in floods into the circulation. Operations for the removal of foreign bodies have been followed by exacerbations of the disease, and even the removal of ancient scabs has its perils. It follows that for these reasons no wound should be treated surgically until at least

one hour has elapsed after the administration of antitoxin. Patients gravely wounded do not often contract tetanus, for the reason that they have usually received a prophylactic dose of serum; but danger threatens those with trivial injuries, or with no visible injuries at all. Scab-covered wounds are a menace; they cork up septic cavities in which anaerobes may flourish. Plain common sense therefore demands the ruthless opening of all deep wounds, followed by frequent irrigation with hydrogen peroxide and the use of light porous dressings which do not exclude air. The patient needs a darkened room and a bed of which the coverings are supported by a cradle. The food given should, if possible, be of the order of 2,000 calories per day. "Avertin" (0.1 cubic centimetre per kilogram of body weight) and paraldehyde reduce rigidity, control spasm, and conduce to sleep. Inhalation anaesthetics, such as the combination of gas and oxygen, are the most suitable and have a small place in treatment; morphine should be sparingly used. In certain parts of South America and the African continent grow many plants of the genus *Strychnos*. From the bark of certain of these the natives have for long ages prepared a black, sticky extract, containing curare, which they store in gourds, rough pots, and bamboo tubes. The stuff, smeared on arrow tips and spears, is used with unfriendly intent against men and animals. It may be swallowed without harm, but weapons so treated inflict wounds which are followed by paralysis and death. The plants employed for this purpose contain one or other of a group of alkaloids, of which curarine is the chief, and most of which are strongly paralytic in action. Curine, allied to curarine, has this property and also possesses the ability to act directly upon the heart muscle. In dogs, after ablation of the parathyreoid glands, the spasms of the resultant tetany have been controlled by injections of curare, but without producing general muscular paralysis. Curare has now been found to possess the same power when administered to the human subject. Cole points out that West, after treating seventeen patients with muscular rigidity due to pyramidal and extrapyramidal lesions, has reported a great reduction of the muscular rigidity, but no weakness or loss of power in the subjects tested. West considers that some samples of curare have the property (which he calls "lissive") of abolishing spasticity without abolishing muscular movement. Without doubt a whole group of alkaloids must be studied and standardized before the pharmacological action of these potent drugs is known. Certain of them are convulsants, others cardiac depressants; others again gravely inhibit respiration. But in some one or other of them resides the valuable lissive fraction which has yet to be isolated.

The knowledge so far gained would indicate that we may be upon the eve of a discovery of great value in the treatment of tetanus. It will be strange if in the future the lethal poison of savages should take its place as an agent for the relief of one of the most distressing of diseases.

Abstracts from Current Medical Literature.

OPHTHALMOLOGY.

Hydrogen Ion Concentration of Tears.

G. N. HOSFORD AND A. M. HICKS (*Archives of Ophthalmology*, January, 1935) deplore the lack of interest manifested in the hydrogen ion concentration of tears until the appearance of the work of Gifford and Smith in 1933. In the past it has been assumed that disagreeable sensations from drops instilled into the eye were due to disturbances of osmotic pressure. C. F. Charlton in 1921 determined for tears a hydrogen ion concentration of 7.2; others make it 7.4, and others 8.0 and 8.6. The eyes are uncomfortable if the pH is above 7.8 or below 6.6, and these are the limits of the pH of solutions that can be used without producing unpleasant sensations. If the reaction of the tears is highly alkaline, an acid buffer solution, if instilled, will give relief, but of short duration. A painful ulcer of the cornea is associated with alkaline tears and is relieved by acid solutions. Staphylococci and streptococci tend to form acid, so it is logical to use an alkaline buffer solution.

Radiography of the Bulb with Exophthalmos.

M. KADIN-SULZER (*The British Journal of Ophthalmology*, February, 1935) refers to the advantages of Vogt's skeleton-free Röntgenograph of the eyeball. The disadvantage of the method is that only the most anterior portion of the eye is accessible. This can be remedied by the injection, temporally and posteriorly to the globe, of three cubic centimetres of a 1% solution of "Novocain", which produces a certain exophthalmos. It is strongly recommended, previous to taking a Vogt radiograph, to produce an exophthalmos in this way so that particles more posteriorly situated may be rendered visible.

Anisokonia.

W. L. HUGHES (*American Journal of Ophthalmology*, August, 1935) reports the results of examination of sixty patients with the ophthalmometer to determine if any asymmetry of the relative size and shape of the ocular images was present which might be a cause of continued ocular discomfort. For the test the vision should be at least $\frac{20}{40}$ and $\frac{20}{60}$. Fusion must be present and no manifest deviation. The patient is seated at the instrument, facing a white screen twenty feet away. Both eyes fix a central black disk. There are four small holes 4° away from the centre, above, below and on each side. Behind each of these holes is a light so arranged that it can be seen

by only one eye of the patient, the other eye seeing the hole as a black dot. The patient looks at the central disk and then at the upper small spot, and is asked if the light seems to be exactly level with or above or below the spot. If the lights are directed towards the right eye, the left eye sees only the dots. If the upper light appears higher than the dot, the retinal image of the right eye is greater than that of the left eye. The eyes are then turned to the other small spots and similar readings are taken. A modified screen is employed for reading distance. When anisokonia is found and measured, special lenses are used for its clinical correction. The thickness and curvatures of the front and back surfaces of the lenses are calculated by referring to a series of tables prepared by the Department of Research in Physiological Optics at Dartmouth. Relief of symptoms was obtained in 60% of the cases.

The Formation of Papilloedema.

H. LAUBER (*Archives of Ophthalmology*, May, 1935) states that none of the theories concerning the formation of papilloedema will bear thorough criticism. Sobanski, following the lines of Baillart in the study of venous and arterial pressure of the retinal vessels, has determined that venous pulsation in the retina appears at the moment when intraocular tension becomes equal to the pressure in the retinal veins. A study of 93 patients in the neurological clinic discovered that the venous retinal pressure stands in intimate relation to the intracranial pressure. The measuring of the venous retinal pressure with the ophthalmodynamometer of Baillart is a sufficiently exact method for the definition of the intracranial pressure. The venous pressure in millimetres multiplied by ten gives the intracranial pressure in millimetres of water. Every increase of intracranial pressure causes increase of retinal venous pressure. When papilloedema appears, one always finds a disturbance of the proportion of diastolic arterial to venous retinal pressure, the proportion being 1:1.5. In cases of high intracranial pressure without papilloedema the relation of arterial to venous retinal pressure remains normal—between 1:1.9 and 1:3. The level of retinal arterial pressure is high. When the optic nerve was experimentally compressed immediately behind the globe, complete ischaemia of the retina was obtained; but when the nerve was compressed only so far as to suppress venous circulation without interrupting arterial circulation, there followed dilatation and tortuosity of the retinal veins, hyperaemia of the disk, blurring of its edges and swelling. In high intracranial pressure the obstruction to the venous circulation is located in the intervaginal spaces of the optic nerve, where cerebro-spinal fluid is accumulated under pressure. If arterial

tension in the retina is low, even a slight increase of venous pressure caused by high intracranial pressure produces papilloedema; if the arterial tension is high, it requires a much higher venous pressure to produce this effect. The absence of papilloedema in thrombosis of the central vein might be proffered as an objection to this theory; but this absence is only apparent; it is lost in the retinal oedema, but can be recognized with the binocular ophthalmoscope of Guttstad.

Bilateral Central Artery and Vein Occlusion.

M. B. BENDER (*American Journal of Ophthalmology*, February, 1935) reports a case of occlusion of both retinal arteries and veins following teeth extraction under local anaesthesia. The patient, a woman of thirty-two years, on the day after the extractions had blurring of vision, headache, flashes of green and red colours, injected pharynx and a rise in temperature. The next day vision was almost gone. The right disk was blurred, and haemorrhages, exudate and oedema existed throughout the retina—a picture of central retinal vein thrombosis. The condition of the left fundus was similar, but worse. Exudate then formed on the anterior capsule of the lens. About six weeks later the right nerve head was yellowish white and no vessels were present upon it. No X ray picture was taken.

Blepharochalasis.

B. Y. ALVIS (*American Journal of Ophthalmology*, March, 1935) describes the pathology, course and treatment of blepharochalasis, called by other authors *ptosis adiposa* or *ptosis atrophica*. A typical case was that of a girl of fourteen years who complained of drooping of the upper lids. The skin of the lids was wrinkled, lax and dusky. The condition had come about from attacks of oedema beginning at the age of eleven years, recurring frequently. Considerable improvement was obtained by the excision of a strip of skin and subcutaneous tissue five to seven millimetres broad. The author claims to be the first to notice that the exposed levator acted freely in attempts to open the lid, but its attachment to the tarsus was so lax that little effect was produced. The sutures should pass through, from below, the skin, tarsus, levator and skin. Surgical treatment has alone been successful. A history of the literature and bibliography is included.

Tobacco Amblyopia.

F. C. CORDS AND D. O. HARRINGTON (*Archives of Ophthalmology*, March, 1935) discuss the treatment of tobacco amblyopia, and, in spite of the controversy as to whether tobacco acts as a vascular or nerve poison, maintain that only those drugs which have a direct effect on the circulation have

been of any definite benefit. This is confirmed by the rapid recovery which followed their treatment in eight cases. Six patients received daily subcutaneous injections of 100 milligrammes of sodium nitrite in 1.0 cubic centimetre of an isotonic solution of sodium chloride. The number of injections was determined by the patient's response. One patient received twelve injections and was then given 0.09 gramme (1.5 grains) a day of erythrol tetranitrate by mouth. The eighth patient received only erythrol tetranitrate by mouth. Other vaso-dilating drugs may be equally successful.

OTO-RHINO-LARYNGOLOGY.

Antenatal Medication as a Possible Aetiological Factor of Deafness in the New-Born.

H. MARSHALL TAYLOR (*Archives of Otolaryngology*, December, 1934), in a paper dealing with antenatal medication as a possible aetiological factor in deafness in the new-born, concludes that certain drugs have a predilection for the auditory nerve, and that idiosyncrasy for drugs may be an important factor in causing nerve deafness. Quinine takes precedence among the drugs causing nerve deafness and is frequently used during pregnancy. Evidence has been presented that certain drugs that have a predilection for the auditory nerve, when administered to the pregnant mother, readily pass through the placenta and may be toxic to the foetus, a possibility that the otologist has virtually ignored. Antenatal medication as a possible aetiological factor of deafness in the new-born is of sufficient importance to warrant the cooperative research of the biochemist, the histopathologist, the obstetrician and the otologist.

Maxillary Sinusitis.

IAN B. THORBURN AND LEO L. RATAZZI (*The Journal of Laryngology and Otolaryngology*, March, 1935) give an account of the cause, symptomatology, diagnosis, treatment, and results in all cases of maxillary sinusitis treated by Dr. J. S. Fraser in his wards and out-patient department at the Edinburgh Royal Infirmary during the years 1921 to 1930 inclusive. A series of 508 cases, 328 chronic and 180 acute, of maxillary sinusitis is reviewed. The authors are of the opinion that, with certain exceptions in chronic cases, when conservative treatment fails, preference should be given in the first place to the intranasal rather than to the radical operation. The intranasal operation on the maxillary sinus was carried out in 48 acute and in 147 chronic cases; it is now more often tried in chronic cases than formerly. Local anaesthesia alone was employed in 35 acute cases (73%) and in 105 chronic cases (71.5%) and in the remainder, combined local and

general anaesthesia was used. In practically every case the anterior end of the inferior turbinate was removed; the medial wall of the antrum was opened with Tilley's burrs, and the opening thus made was enlarged and fragments of bone removed with Ostrom's and Grünwald's forceps. The opening into the maxillary sinus, or the nasal cavity itself, was not packed, except in cases in which there was considerable haemorrhage. Forty-eight hours after operation the maxillary sinus was washed out by means of a curved cannula, to which a Higginson's syringe was attached. No medicaments were introduced by means of the syringe. Lavage was repeated twice daily at first, but, as the discharge lessened, was carried out less frequently. In cases with involvement of the frontal sinus and the ethmoid cells, the anterior end and the lower border of the middle turbinate were removed, the anterior ethmoid cells were opened up, and the naso-frontal duct was enlarged, this in addition to the operation on the maxillary antrum.

Acute Cerebellar Abscess.

GEORGE E. SHAMBAUGH, JUNIOR (*Archives of Otolaryngology*, April, 1935) reports a case of acute cerebellar abscess. He had the opportunity of observing the complete course of a cerebellar abscess in a hospital patient from the onset of *otitis media*, which caused the abscess, to recovery following drainage. His conclusions are that the stage of invasion of the abscess of the brain was characterized by predominating systemic symptoms (fever) from the advancing thrombophlebitis, the symptoms of local cerebral involvement (vomiting) being minimal. The second stage, that of early necrosis and encephalitis, was characterized by signs of rapidly increasing intracranial pressure (vomiting, headache, lethargy, slow pulse, choked disks, coma and convulsions), with localizing neurological signs beginning to appear. The third stage, that of encapsulation, was characterized by continued signs of increased intracranial pressure, but with the localizing neurological signs predominating. The stage of recovery was marked by rapid disappearance of the signs of increased intracranial pressure followed by a more gradual recovery from the neurological changes. Encapsulation was definitely developed three and a half weeks after the initial cerebral invasion. Repeated aspirations were not sufficient. Constant drainage was necessary. The encephalitis surrounding the abscess was more threatening to life than the abscess itself. Had a larger drain been inserted or any attempt been made to suck out, inspect or pack the abscess cavity, the added encephalitis would probably have been fatal. In cases of acute abscess of the brain, drainage must be established with a minimum of trauma to the tissue. A rubber catheter makes a satisfactory

drain, but it must actually penetrate the capsule. A preliminary decompression will relieve the acute symptoms in the early stages and allow delay in exploration until encapsulation and walling off have occurred. By limiting the dural opening to a simple 1.25 centimetre (half inch) incision, massive herniation is prevented. The neurological signs of abscess of the brain are due more to the associated encephalitis than to the actual necrosis of the brain tissue, as evidenced by complete restoration of cerebellar function in the patient.

The Immunological Aspect of Electro-Surgery in Rhino-Laryngology.

LEWIS J. SILVERS (*Archives of Otolaryngology*, May, 1935), in order that a scientific appraisal of this so-called "autogenous vaccine reaction" might be made, undertook an analysis of the reaction in 100 patients on whom electro-surgical tonsillectomy was performed. Much confusion is still prevalent as to the reaction that occurs following each treatment of the tonsil electro-surgically during the course of total extirpation of the tonsils. A systematic bacteriological examination of each tonsil reveals a definite relationship between the more pronounced grip-like reaction and the potency of the invading organism. Allowance being made for extraneous irritation, the amount of treatment at each sitting does not necessarily determine the degree of reaction to be expected. The potency of the invading organism is the decisive factor. The more virulent the invading organism, the more pronounced the resultant local and general reactions. The greatest amount of general reaction is noted at the first two treatments. It is rare to note a general reaction after the fourth exposure to electro-surgery. Relief from distal pain and stiffness, when these are present, follows shortly after the first few treatments.

The Descending Bony Facial Canal in Relation to Complications of Mastoidectomy.

EDWARD F. ZIEGELMAN (*Archives of Otolaryngology*, May, 1935), in a presentation dealing with the descending bony facial canal in relation to the complications of mastoidectomy, concludes that the bony facial canal varies in length and diameter. In some temporal bones pneumatic cells invade the bony osseous canal to a point of great clinical and surgical importance. The observations presented warrant the belief that disturbed physiological relations of the facial nerve, whether transitory or based on a definite pathological process, with recovery or death by meningitis, must be analysed on the added basis of cellular invasion of the bony canal. Not all facial paralysis, either transitory or with a fatal termination, following operative procedure on the mastoid, is due to error in surgical technique.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE NEW SOUTH WALES BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held on September 26, 1935, at the Robert H. Todd Assembly Hall, British Medical Association House, 135, Macquarie Street, Sydney, Dr. A. M. DAVIDSON, the President, in the chair.

The Otological Manifestations of Neurological Disease.

DR. D. G. CARRUTHERS read a paper entitled: "The Otological Manifestations of Neurological Disease" (see page 739).

DR. OLIVER LATHAM said that the approach to the treatment of intracranial diseases did not rest with the diagnosis, the etiology and the nature of the pathological lesion; certain forms of trouble, such as tumours, localized inflammations, or foreign bodies of whatsoever nature, demanded correct localization. Apart from the well known Jacksonian phenomena associated with lesions of the Rolandic area, some of the most important localizing signs were associated with some alteration in the functions of one or other or several of the cranial nerves or nerves of special sense.

Neurologists, of course, made the examination of these systems, or some of them, one of their first considerations. Eye and ear and throat and nose specialists on their part had to assure themselves of the state of the nervous functioning of the part before taking up the consideration and treatment of more mundane affections. The keenest workers among these latter occasionally came across a succession of cases wherein the recurrences of certain signs and symptoms or reactions to certain tests appeared to them to suggest a syndrome whereon they might dare to hang a suggestion of localization *et cetera*. However, the patients commonly passed away from them to the surgeon or, in other lands till recently, to the brain surgeon. They had felt this position to be most unsatisfactory, presumably because they were not always able to follow up what was ultimately found intracranially at operation or *post mortem*. Some of them had actually asked that, in reverse as it were, cases involving some of the special senses be referred to them in consultation by the surgeons or operating neurologists before being finally dealt with. This state of affairs appeared especially to be the plaint of the aural surgeon who had interested himself particularly in those tests involving the divisions of the eighth nerve. In some of the smaller Australian capitals quite a lot of intracranial surgery was done by operating aural surgeons. During the last twenty-five years the laboratory of the mental hospitals had received for examination nearly two hundred intracranial tumours among the many brains and spinal cords examined. Naturally most of the accompanying histories were of the briefest. Some, however, were sufficiently full to indicate that the surgeons and neurologists did at times call in consultation eye and ear specialists. It was interesting that in the earlier years the eye specialists predominated. No doubt the work of Bárány had added a zest to the aural findings later. Also came to light the fact that when neurologists were lacking more use was made of eye and ear men; however, in Brisbane a neurologist called in an ear man, since he happened to be a competent brain surgeon. In this city practised, too, Lockhart Gibson, who stressed early papilloedema in acute lead encephalitis in children, and Francis, who noted nasal sensitiveness in neurotic states.

Dr. Latham then referred to some cases illustrating these points.

As far back as 1918 a woman complaining of certain head symptoms had been recommended for operation at the Sydney Hospital. However, she was referred to the old Moorcliff Eye Hospital, where a cranial operation was advised against. The patient went to the country and

later, developing fits, improved, to die ultimately in the Balmain Hospital. Professor Welsh had kindly handed the brain to Dr. Latham's department, and the histological evidences of chronic meningitis, *endarteritis obliterans* and granulations on the fourth ventricle strongly suggested chronic brain syphilis.

On extracting but the barest outlines of the histories Dr. Latham found that in 1922 a youth of twenty-two years of age developed sudden frontal headache aggravated by any movements increasing intraocular tension. He also developed vertigo with disturbance of smell. An X ray examination of the skull was not helpful, and on referring the patient to an eye specialist, papilloedema and later optic neuritis were noted. When finally Dr. Inglis handed the cerebellum to Dr. Latham a cerebellar tumour was evident.

In 1928 Dr. Bostock sent from Brisbane the brain of a woman of sixty years, which contained in the occipital region an interesting tumour histologically an ependymoma. She had had headaches for years, later getting worse. They had been regarded as functional. However, she afterwards developed head retraction, optic neuritis, weakness of the external rectus muscle, then astereognosis in the left arm, anesthesia and muscular rigidity. She seemed blind, repeated words and was disorientated. The diagnosis was encephalitis and meningitis, possibly of the right parietal region. Dr. Bostock prevailed on Dr. R. Graham Brown, a throat specialist, to do a ventricular puncture, which revealed blockage of the left posterior horn and xanthochromia of the cerebro-spinal fluid, afterwards confirmed. *Post mortem* examination revealed a soft necrotic process involving the left parietal area and crossing the corpus callosum to reach the right side as well, the lesions including some plastic exudation.

Two Newcastle children provided those obscure types of conditions which were clinically and pathologically some type of encephalitis. The first child, aged three years, had a week's history of right-sided transient paralysis of the face, eye muscles, and body. A head operation involving occipital exploration revealed nothing. The eye specialist's notes showed double optic neuritis. Histologically the medulla and pons showed a peculiar granulomatous reaction, something between poliomyelitis and endothelial proliferation, with some difficulty in excluding a tumour formation. A little later on another child, aged eleven years, fell in a fit, which recurred daily for five weeks. There was right-sided otorrhoea with slight ptosis and hemiparesis with rigidity on the left. Her reflexes were exaggerated and the smell of roses *et cetera* could not be recognized. Dr. Watkins, a throat and nose specialist, from whom Dr. Latham had received many neurological specimens, operated, the radiologist having reported some shadowing over the right *tegmen tympani*. The histological picture was one of definite non-purulent encephalitis with marked vascular involvement.

It gave Dr. Latham great pleasure in recording the care given to the consideration of the manifold symptoms and signs present in H.M.G., a girl aged seventeen years, at the Newcastle General Hospital. She was minutely examined by surgeon, physician, eye, ear and nose specialist, each recording his findings. These included nystagmus on effort, Bárány's tests (positive), reflexes, muscular tone *et cetera*, the combined opinions inclining to kidney trouble, kidney or brain tumour. Although the X rays again did not help, an exploratory operation was performed with some relief. *Post mortem* examination showed a cerebral abscess, as well as numerous secondary deposits, metastases from a kidney tumour, one of these occupying one-half of the cerebellum and pons and the cerebello-pontine angle. These were the types of tumours which might give quite definite signs suggesting that the tumour was suitable for operation, yet withal actually inoperable. No doubt most of the tumours in this region were true eighth nerve tumours, but not a few might in position and signs imitate them; yet *post mortem* be either protrusions of growths from the pons, medulla, ventricle, or even the occipital lobe, and thus true gliomata or, of course, at times one of a series of von Recklinghausen's hyperplasias.

As an example, he would include a Newcastle case of which a specimen had been recently received. A large mass, two inches across, from the cerebello-pontine angle was carefully sectioned *in toto*. They had been fortunate in including at one edge the small nerve from which this schwannoma arose. It would have been readily operable. The signs had included marked past-pointing, a spastic state of arms and legs, certain reflex phenomena, marked swelling of both disks with hæmorrhage, but no retinitis. The patient had been pregnant, with severe kidney disease and marked spinal fluid pressure, and the diagnosis had included kidney trouble or cerebral tumour. Here, too, all the specialists had been given an opportunity of making a diagnosis.

Many people died of cerebral softenings, and Dr. Latham could not stress too much the fact that no large vessel might be involved though the lesion were great. This old fact was seldom taken into consideration. At times they might simulate a tumour, as, for instance, in a patient from Orange, who seemed blind, and one of whose fundi or disks appeared unusual. Dr. A. E. Colvin had shown the peculiarity to be a congenital defect of nerve fibres not likely to interfere with vision. Definite paralysis eventuated and the histological evidence was a definite softening of the right occipito-temporal cortex and parietal area, as well as gliosis and vascular sclerosis. A tumour had been suspected.

Dr. Latham had received many interesting neurological tissues from Dr. R. Graham Brown, including one from a case in which, having afforded relief to a woman patient by a decompression for many months, he obtained *post mortem* a circumscribed tumour from the roof of the third ventricle, histologically a medullo-epithelioma. Recent articles revealed successful attempts to diagnose and remove tumours from this region, such as that of Greenfield and Robertson.

Many brain surgeons had experienced the chagrin of definitely feeling and not finding tumour formation in the brain on exposing it, and this was also the experience of Dr. Watkins. Thus a patient having trouble with his glasses consulted an oculist and immediately got feelings of paralysis. After improvement headaches and vertigo set in, and vomiting. In hospital the patient could not express himself, and he had right-sided homonymous hemianopia. He could understand spoken words, but could not talk or write or read. Many other signs led to a decision to perform craniotomy. On operation the dura did not pulsate, and on opening it the brain bulged and a mass could be definitely felt anterior to the left occipital pole. A biopsy revealed no recognizable lesion, but distinctly altered brain tissue, including somewhat large cells in the perivascular spaces. Not always did this tissue override a tumour deeper down.

In Dr. Latham's last case it had fallen to Dr. Candlish to test the eyesight of an engineer on a vehicular ferry. He found definite aphasia; the patient could see letters, but not name them, called a pen a pencil, but knew that he was wrong. Dr. Candlish diagnosed word deafness and blindness. In view of the patient's calling and his having to see and to interpret messages from the bridge, the question had been raised as to whether he was fit for his job. He ultimately developed delirium and paralysis, and the brain on section showed a tumour (*glioblastoma multiforme*) undermining the left occipital area anterior to the *sulcus lunatus* and including the posterior end of the middle and inferior temporal gyri, closely corresponding to the area of normal aphasia as figured by Head in Figures X and XI in his work.

These few examples disclosed, Dr. Latham thought, the help that eye and ear specialists might be able to bring to certain types of cases of neurological interest and at the same time bore witness to many fruitful consultations in the past between them and physicians and brain surgeons.

DR. GARNET HALLORAN said that the excellence of Dr. Carruthers' paper, followed by the *post mortem* findings by Dr. Latham, served to bring home the point that they had already learned, namely, the necessity for closer collaboration between the specialties. He was sorry that there

were not more neurological surgeons and physicians present at the meeting.

Dr. Carruthers had brought forward many points, some dogmatic and some showing that they were at present on the borderline of a greater knowledge which must emerge in their time. Dr. Carruthers stressed the point that no vertigo was present with a subtentorial tumour. He had also stressed that in suspected brain tumour deafness should give a clue as to whether the tumour was likely to be intracerebral or extracerebral. This was of great importance in prognosis.

Dr. Halloran asked what was the range of normality between hypo- and hyper-irritability of the labyrinth, and said that the meaning of variations in irritability was not known. The late Dr. Pulleine, of Adelaide, had investigated the results of hypo-irritability and thought that it was suggestive of disseminated sclerosis. This should not be overlooked.

Dr. Carruthers also brought out the importance of eighth nerve symptoms in cerebello-pontine angle tumour. Difficulty in diagnosis arose in cases in which the symptoms were early as well as when they were late. In late cases they were perhaps familiar with total paralysis of the eighth nerve in which the vestibular and cochlear divisions were involved. What was most puzzling was whether there was paralysis of the labyrinth or of the eighth nerve trunk. The only way to determine this was by electrical stimulation of the eighth nerve trunk. If it was alive, nystagmus would arise.

In conclusion, Dr. Halloran made a plea for the standardization of caloric testing. Standards should also be laid down for rotation tests. Each medical practitioner had a habit of adopting his own standard. Dr. Halloran had seen a good method adopted at Frankfort, in which turning was not done by hand, but by an electrical turning table, which turned at a uniform rate. Thus a standard rate was always assured.

DR. E. P. BLASHKI thanked Dr. Carruthers for his brilliant paper and for the trouble that he had taken in its preparation. Cerebral lesions were of the greatest interest. The propositions put forward by Dr. Carruthers were of the greatest assistance, especially in differentiating between lesions that were intracerebral or extracerebral. Dr. Latham's cases gave the greatest endorsement to the necessity for cooperation with the otologist. In none of the cases reported by Dr. Latham had the otologist's report been included.

DR. C. A. HOGG agreed with Dr. Carruthers in regard to the value of cooperation between the neurologist and ear surgeon in the testing of the auditory nerve tracts in the medulla and the pons; such cooperation would help in the elucidation of some cases of tumour of the brain.

Dr. Hogg said it was clear that a tumour of the auditory nerve, before it entered the medulla and divided, could give unequivocal signs. Some years ago he had read a book in which the writer had postulated that the fibres of the eighth nerve, after they had entered the brain stem, divided into different branches, which passed to different regions of the brain, one set dealing with nystagmus reactions and the other set with vertigo, past-pointing *et cetera*. Dr. Hogg gave details of this supposed arrangement and of the supposed results of involvement of the different fibres. He thought that it was too simple and doubted if it was true.

In regard to the caloric reaction, Dr. Hogg said that this was based on the results of making a canal vertical. In regard to measurements of hearing, Dr. Hogg asked if members were conversant with an audiometer from Oslo University, by which it was possible to measure accurately deficiency in hearing. He also asked Dr. Carruthers as to his experience of the Dundas Grant instrument for applying cold air for testing the semicircular canals.

DR. D. W. H. ARNOTT thanked Dr. Carruthers for his thoughtful paper. It was a curious fact that in all these cases for diagnosis the eye specialist was called into consultation, but the ear specialist not at all. It was known that in tumours of the cerebello-pontine angles, the most hopeful cases, examination of the auditory senses gave the

only hope of localizing the lesion. It was strange that this method of diagnosis was neglected. Perhaps the neglect was partly due to the complexity of the method. But it was gratifying that such examinations were becoming simpler. Dr. Arnott was sure that Dr. Carruthers had helped in that regard.

Dr. Carruthers, in reply, thanked members for the kind way in which they had received his paper. He regretted that the people who did the operations on cerebral tumours were not present, because he wanted in his paper to aim at them, as it was they who had most of the material in their hands which might be useful to the otologist, yet they commonly failed to consult an otologist unless it happened that eighth nerve involvement was already manifest.

Dr. Hogg had said that he (Dr. Carruthers) had been rather dogmatic, and Dr. Carruthers said that it was necessary to be dogmatic at this stage. They must set their feet down firmly and endeavour either to prove their assumptions incorrect or else to substantiate them.

Speaking of the induction of vertigo from labyrinthine stimulation, Dr. Carruthers thought this was rarely, if ever, produced in cases with a subtentorial lesion. Dr. Carruthers himself had seen no vertigo in subtentorial lesions. He said, however, that it was often not inducible even in normal persons.

In regard to hypo-irritability and hyper-irritability of the labyrinth, Dr. Carruthers had tested many normal persons and had found a more or less constant figure for the normal individual. The only instances in which hyper-irritability had been found were in neurasthenia, and this was a useful method of confirming a diagnosis of that condition. These patients were also giddy and frightened. Dr. Carruthers had found that the galvanic test was disappointing in normal patients; he wondered whether this was due to an error in technique, but in any case he did not rely on it.

The book to which Dr. Hogg had referred was by Jones, an American. It might sound all right, but it had been impossible, in his experience, to demonstrate clinically such fine differences referable to the various cerebellar peduncles. An important clinical feature was the difference in vulnerability of the vertical and horizontal canals. As far as the verticalization of canals in testing was concerned, the two positions were adopted for the purpose of bringing the horizontal or the vertical canals respectively into the vertical position.

Dr. Carruthers had not seen the audiometer that Dr. Hogg had mentioned. He himself had always used the Western Electric apparatus, which was quite accurate and most satisfactory. The Dundas Grant method of air testing was good, but it was necessary to have the correct apparatus and to keep it in good order. The water test was satisfactory. Dr. Carruthers said that the apparatus for this was always at hand, and one got used to it.

In conclusion, Dr. Carruthers said that he wished to leave with the otologists the impression that they should work towards the establishment of a standard method of carrying out these tests, as well as of recording their results. All cerebral cases, including those beyond the posterior fossa, were worth placing before the otologist.

NOMINATIONS AND ELECTIONS.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Kelly, James Patrick, L.R.C.P. and S., 1889 (Edinburgh), M.B., Ch.B., 1902 (Univ. Melbourne), 21, Glen Street, Bondi.

Post-Graduate Work.

THE NEW SOUTH WALES POST-GRADUATE COMMITTEE IN MEDICINE.

THE New South Wales Permanent Post-Graduate Committee and the New South Wales Post-Graduate Committee in Medicine, the University of Sydney, announce that the latter body was constituted on Monday, November 4, 1935, and that the former body will cease to exist on November 30, 1935. All the functions and work of the New South Wales Permanent Post-Graduate Committee, including any matter which that Committee has undertaken or authorized, will be taken over or completed by the New South Wales Post-Graduate Committee in Medicine, the University of Sydney.

The New South Wales Branch of the British Medical Association, the founders of the New South Wales Permanent Post-Graduate Committee, to which all the funds and property of that committee revert when it ceases to function, has made a gift of all such funds and property to the University of Sydney, to be paid to a fund to be known as the Post-Graduate Fund in Medicine.

The New South Wales Post-Graduate Committee in Medicine has been established under a by-law, being Chapter XXXIV of the By-Laws of the University of Sydney, which provides for a post-graduate committee in medicine for the promotion of post-graduate education, study, work and research in medicine and the advancement of the art and science of medicine. The committee consists of the Chancellor, the Deputy-Chancellor, the Vice-Chancellor, and the Dean of the Faculty of Medicine as *ex officio* members; a number of representative members, not to exceed fifteen, appointed by the Senate; a number of coopted members, not to exceed four; and a chairman and an honorary secretary, who may be appointed either from among members of the committee or otherwise. The Senate of the University of Sydney shall provide secretarial assistance to the committee.

The resolutions relating to this committee provide that representative members shall be appointed in respect of the following bodies: (a) the Faculty of Medicine; (b) the New South Wales Branch of the British Medical Association; (c) the honorary medical staffs of each of the following hospitals: Lewisham Hospital, Prince Henry Hospital, Royal Alexandra Hospital for Children, Royal Hospital for Women, Royal North Shore Hospital of Sydney, Royal Prince Alfred Hospital, Saint Vincent's Hospital, The Sydney Hospital, The Women's Hospital, Crown Street, and such other bodies as the Senate may determine. There shall be one member representing each of these bodies, except in the case of the New South Wales Branch of the British Medical Association, of which there shall be two representatives. These appointments are made by the Senate on the recommendation of the committee, who shall in the first instance consult the body concerned before making the recommendation. The coopted members are elected by the committee. Excepting the *ex officio* members or the member representative of the Faculty of Medicine, no person shall be a member of the committee unless he is a member of the British Medical Association. All representative members must be members of the body which they represent. In the case of a representative of the honorary medical staff of any hospital, he must be an active member of that staff. In the case of the New South Wales Branch of the British Medical Association, he must be a member of the Branch. Coopted members shall hold office until the next annual meeting of the committee, and a representative member until he ceases to qualify to be a member representative of the body in respect of which he was appointed, except in the case of the British Medical Association, where the appointment will be made annually. The committee may, with the approval of the Senate, limit the period of holding of office of the Chairman, Honorary Secretary or a member representative of any body. The office of any member of the committee, except in the case of an *ex officio* member, may be terminated by the Senate.

Under the powers, duties and functions of this committee the committee may: (a) organize post-graduate courses, demonstrations and lectures, and other post-graduate instruction in medicine within the University or elsewhere in New South Wales; (b) engage in such activities as it thinks desirable for promoting post-graduate education, study, work and research in medicine, and for advancing the art and science of medicine; (c) cooperate with scientific bodies recognized as having similar or allied objects; (d) do such things as it thinks proper for any of the matters mentioned in this resolution; and also may determine the tenure of office of lecturers and their duties, remuneration and expenses to be paid and fees to be charged. All money received by or on behalf of this committee shall be paid into a separate fund, to be known as the Post-Graduate Fund in Medicine, and be used for carrying on the work of the committee. Further, all donations, bequests and government grants made for the promotion of post-graduate education in medicine, and such moneys as may be advanced by the Senate of the University of Sydney to the committee, shall be paid into this fund and applied in accordance with any trusts or directions. The officers of the committee shall be the Chairman, the Vice-Chairman, the Honorary Secretary and the Honorary Assistant Secretary. The committee may submit to the Senate proposals for the better working or amendment of the by-laws and resolutions, including proposals regarding representation of bodies, tenure of office of members, powers, duties and functions of the committee, and the committee may make its own rules for carrying out the resolutions. With the exception that the *ex officio* officers of the University and a member representative of the Prince Henry Hospital have been added, the personnel of the new committee remains the same as that of the New South Wales Permanent Post-Graduate Committee.

The course in ophthalmology which has just been completed is the last course which will be held under the auspices of the New South Wales Permanent Post-Graduate Committee, and all future undertakings will be carried out by the New South Wales Post-Graduate Committee in Medicine. It is the intention of this committee, early in the year, to publish a programme for 1936, which is likely to include not only the general revision course in May and a number of week-end country courses, but several courses in special subjects, and probably lectures by one or more overseas lecturers. It is also hoped that during the coming year courses for higher degrees will be instituted.

SPECIAL LECTURE ON MECHANICS OF DIGESTION.

A LECTURE on the mechanics of digestion will be given by A. E. Barclay, O.B.E., M.A., B.C. (Cambridge), M.D., D.M.R.E., at the Robert H. Todd Assembly Hall, British Medical Association House, 135, Macquarie Street, Sydney, at 8.30 p.m. on Thursday, December 5, 1935. The lecture will be of general interest. The fee for attendance is five shillings, and payment may be made at the door.

Dr. Barclay is regarded as one of the world's leading authorities on the radiology of the gastro-intestinal tract. He is Director of the Radiological Department, Royal Infirmary, Edinburgh, and late lecturer and examiner in radiology at the University of Cambridge. He is a vice-president of the British Institute of Radiology and a former president of the Röntgen Society and of the Section of Electro-Therapeutics of the British Medical Association.

Correspondence.

THE UNIVERSITY OF MELBOURNE UNION BUILDING FUND.

SIR: May I crave space in your columns to bring to the notice of your readers the University Union Building Fund appeal? Literature dealing with the matter will shortly be circulated and hence I will be brief.

The present Union buildings are a disgrace; the need for better accommodation is too obvious to need argument. The Union strives to bring together staff, students and graduates so as to foster the interests of the University and to create an effective corporate life. That this does not exist at present I will be the first to admit. It is for this reason that a new building is imperative.

When the British Medical Association annual meeting was held in Melbourne the University willingly set free its buildings. But it was impossible for the Union to play the part it should. A tin hut is not an appropriate environment for informal teas and lunches to distinguished visitors, nor do cold and draughty common rooms provide attractive lounges. A modern union could have served as a useful adjunct to the meeting—at least by providing meals within the University, at which visitors could have been entertained in comfort.

Plans have been drawn up for a dignified block which will provide all the facilities that are needed. The final plan is a block of three stories, but at the moment only two are to be built. Twenty thousand pounds have been collected; a loan of £20,000 has been rendered possible by the fact that the students have voluntarily doubled their subscriptions so that the revenue of the Union will be sufficient to refund the loan. The staff are supporting the project and the best part of £2,000 has been given or promised. Another £20,000 is needed. We wish to begin building next March, so that the matter is one of urgency.

What of the graduates? In nearly all the Faculties a special appeal has been conducted; that in the Faculty of Medicine was postponed because of the British Medical Association's annual meeting. There are three reasons why graduates should help. First, a student's fees cover only 40% of the cost of his education and thus every professional man has had part of the cost of his education defrayed by the community. Secondly, a new Union building will help to improve the class of graduate from which the professions draw their recruits. The benefits of a common life need not be elaborated, and the present Union is a hindrance to student life because of its lack of comfort. Thirdly, unless graduates are willing to support their own university, we cannot expect the community as a whole to do so. Hence every subscription, however small, is welcome, for it is a proof of the practical interest of graduates in their university.

May I ask your sympathetic consideration of this appeal? The Vice-Chancellor has stated that the first of the needs of the University is the provision of an effective Union building.

Yours, etc.,

G. W. PATON,

Chairman of the University Union.

The University of Melbourne,
November 4, 1935.

THE ELIZABETH KENNY (NEW SOUTH WALES) CLINIC.

SIR: With regard to the establishment of The Elizabeth Kenny (New South Wales) Clinic at the Royal North Shore Hospital of Sydney, we would be pleased if you would publish the following facts:

1. The Elizabeth Kenny (New South Wales) Clinic was established at the instigation of the Federal and State Governments for the purpose of investigating the efficacy of Sister Kenny's methods in relation to cases of paralysis.
2. The Board of Directors of the Royal North Shore Hospital consented to the Government's request to establish the clinic for such purpose.

3. Following the Board's approval of the institution of the clinic at this hospital, the cooperation of the honorary medical staff was requested and the staff agreed to facilitate a thorough investigation of the methods.

In following the policy laid down, a committee of investigation was appointed on which certain members of the staff were asked and consented to serve, and it is from the reports issued by this committee that the value of Sister Kenny's methods will be judged.

The position of the staff at the present time is that, while they are pleased to afford every facility for thorough investigation into the results claimed for Sister Kenny's methods, the establishment of the clinic at this hospital does not imply any approval or disapproval of the theory or methods by any member of the staff.

Yours, etc.,

ARTHUR C. RUSSELL,
Secretary,

St. Leonards,
Sydney,
November 18, 1935.

Royal North Shore Hospital
of Sydney.

Obituary.

EDWARD CULBERTSON HOPE.

We regret to announce the death of Dr. Edward Culbertson Hope, which occurred on November 20, 1935, at Manly, New South Wales.

JOHN BLACK McILROY.

We regret to announce the death of Dr. John Black McIlroy, which occurred on November 23, 1935, at Kendall, New South Wales.

NOTICE.

ANY member asked to subscribe to an organization supplying translations from foreign journals is advised to communicate with the Secretary of his local Branch before making any payments.

Diary for the Month.

- DEC. 2.—New South Wales Branch, B.M.A.: Organization and Science Committee.
DEC. 3.—Tasmanian Branch, B.M.A.: Council.
DEC. 3.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
DEC. 4.—Western Australian Branch, B.M.A.: Council.
DEC. 4.—Victorian Branch, B.M.A.: Annual Meeting.
DEC. 5.—South Australian Branch, B.M.A.: Council.
DEC. 10.—Tasmanian Branch, B.M.A.: Branch.
DEC. 10.—New South Wales Branch, B.M.A.: Ethics Committee.
DEC. 12.—New South Wales Branch, B.M.A.: Branch.
DEC. 13.—Queensland Branch, B.M.A.: Annual Meeting.
DEC. 17.—Tasmanian Branch, B.M.A.: Council.
DEC. 17.—New South Wales Branch, B.M.A.: Medical Politics Committee.
DEC. 20.—Queensland Branch, B.M.A.: Council.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser", pages xviii, xix, and xx.

ALFRED HOSPITAL, PRAHRAN, VICTORIA: Honorary Surgeon, Resident Assistant Pathologist.

LAUNCESTON PUBLIC HOSPITAL, LAUNCESTON, TASMANIA: Resident Medical Officer.

PUBLIC SERVICE BOARD, ADELAIDE, SOUTH AUSTRALIA: Director of the Government Laboratory of Bacteriology and Pathology.

QUEEN VICTORIA MEMORIAL HOSPITAL, MELBOURNE, VICTORIA: Resident Medical Officer (female).

REPATRIATION COMMISSION: Medical Officer.

THE RACHEL FORSTER HOSPITAL FOR WOMEN AND CHILDREN, SYDNEY, NEW SOUTH WALES: Honorary Officers, Director of Venereal Diseases Clinic.

WERRIMULL BUSH NURSING HOSPITAL, WERRIMULL, VICTORIA: Medical Officer.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Bulmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phoenix Mutual Provident Society.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
	Brisbane Associate Friendly Societies' Medical Institute. Chillagoe Hospital. Members accepting LODGE appointment and those desiring to accept appointments to any COUNTRY HOSPITAL, are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Lodge appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor", THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

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SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rates are £2 for Australia and £2 5s. abroad per annum payable in advance.